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## Original Communications

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AMERICAN ASSOCIATION OF OBSTETRICIANS,  
GYNECOLOGISTS, AND ABDOMINAL SURGEONS,  
THIRTY-EIGHTH ANNUAL MEETING,  
SEPTEMBER, 1925

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### THE PRESIDENT'S ADDRESS

By ASA B. DAVIS, M.D., F.A.C.S., NEW YORK

A YEAR ago in my absence from our meeting in Cleveland, upon nomination by our valued and beloved Dr. Miller, you elected me as your presiding officer for the ensuing year. I conceive this to be the highest medical honor which has or will come to me. The intimate knowledge acquired in this office of the workings of the Association, its history and accomplishments, increases my respect and high esteem for it. My sense of responsibility, and sometimes my shortcomings, have grown and flourished. I find myself in the Hibernian situation "perfectly solvent in feeling but bankrupt in expression," when I attempt to thank you.

We have met here in one of the many beauty spots of our expansive country for our Thirty-eighth annual session. Fellows, guests, and friends, coming from widely distant points, and our kindred across the invisible border, as your spokesman it becomes my pleasurable duty to bid you a cordial welcome.

A program has been arranged, employing some of the evenings for scientific sessions, leaving part of the daytime for relaxation and pleasure, without losing sight of the primal object of this meeting.

In 1910 I read, by invitation, my first paper before any medical society at the annual meeting of this Association held in Syracuse, and was elected a Fellow the following year at Louisville. At the first

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meeting I was very soon conscious of an atmosphere which was entirely new to me in medical societies. None of those present were well known to me; it is doubtful whether I had ever seen more than three of them, yet I was made at once to feel free and at ease. There was the appearance of a meeting of one large family with all of its members in harmonious accord. In the scientific sessions there was no evidence of weakness, papers were presented, and the subjects freely and frankly discussed without personality or sting. From my observation this characteristic has been maintained throughout succeeding years. It behooves us to believe that this is a priceless heritage and to take great care to see that it is nurtured and not lost. It is fair to state that there has been a vast improvement in this respect in medical meetings.

Individuals, organizations, and nations are endowed with a certain character. Circumstances, environment, and cultural development will do much, but the deep underlying character does not change. Reputation will carry one far, but unsubstantiated by character, sooner or later, there must come a time when its foundations begin to crumble. In taking note of the founders of this Association, their aims and accomplishments, their capacity and the years of service devoted to the advancement of the society's best interests, I think we find an explanation of its achievements and present status. One by one the founders and older members are being gathered to their rest, and the ranks filled and work shifted to other shoulders to carry on.

We note with satisfaction that the guard at our gates of admission has been reenforced, and that an attempt is being made to liquidate some of our frozen investment in the form of inactive members and to prune out the few indifferent, unproductive branches. This process should be conducted with temperance and great care, to the end that no good member shall be eliminated and no likely candidate, who measures up to our requirements, denied admission.

In this land of great and increasing medical activities, workers with records of achievement and promise should be readily found and gathered into our ranks in sufficient numbers to make good our losses and fill our membership list to its capacity. We should maintain our reputation as a working organization, endeavoring with all modesty to carry our standard so high that we cannot properly be the recipients of condescension from any source.

I take it that every Fellow of this Association is an important member of his own community, where by his ability and work he attracts responsibilities and obligations, in continuous procession, which he finds difficult to lay aside. Those who have prepared papers have done so, in many cases, under the midnight or early morning lamp, in time stolen from earned and needed rest. And yet, in goodly numbers, year after year, we meet in annual session to renew old and begin new friendships;

to present and discuss papers, gaining breadth of vision and inspiration, and taking from the common pool of ideas and suggestions according to individual needs, that which will be of value to those entrusting themselves to our care.

In a generation the requirements for a medical education, in time, effort, and money expenditure have enormously increased. My predecessor in his presidential address gave expression to the widespread dissatisfaction with the present-day training given by our medical schools. His opening sentence was, "The profession is earnestly demanding a thorough education in the fundamentals of all men who would presume to treat the sick." In this I believe we all heartily concur.

It is not within my knowledge that any medical school in this country has ever, of itself, turned out a graduate ready and fit to practice medicine. Please bear with me in being personal and concrete. For the past thirty-five years I have had somewhat to do with the appointment and instruction of graduates, internes, undergraduate pupils, and nurses. For instance, in 1924, in the Lying-In Hospital, we gave at least some instruction to 97 graduates, 116 undergraduates, 147 pupil nurses, and also 40 internes who served as House Surgeon or Assistant House Surgeon for a period of four months each.

In my graduation year, 1889, 207 men from a medical student body of between seven and eight hundred presented themselves as candidates for graduation, 153 of which were granted a degree of M.D. Nearly all had spent three years in the medical school; a few in this class were given their degree in less than two years from their first matriculation. I am in favor of a liberal general education for the medical man. It is doubtful whether a majority of the student body of my acquaintance had a general education beyond that of a high school; and yet, time enough has elapsed since then so that many of these men have become eminent, with well-known names in their chosen specialties, taken up after experience in general medicine. Besides meeting the requirements of the medical school we were grounded in theory under instructors of our own providing, thus supplementing the work of the college. These quiz classes were strenuous affairs conducted six days in the week and often well into the summer vacation. As an example of one day's lesson, we were required to know the relations of half of the arteries in the body, according to Gray.

Beyond any question there has been much improvement in the methods of imparting medical instruction; I am, however, very doubtful whether the finished product of the medical school of today is superior to that of a generation ago. Undoubtedly, there still are many fine young students graduated into our profession, and I believe just as truly, that owing to the cost in time, effort, and money, a number of that type which is needed find it impossible to study medicine. The present requirements are: a three year premedical course, four years in the

medical school and, although necessary but not required, at least two years hospital training, making an expenditure of nine years out of a very valuable portion of life, and also many thousands of dollars; with the result, I believe in all fairness, that the personnel of our medical student body and recent graduates has, on the whole, deteriorated, in so far as making them good practitioners of medicine is concerned. I find many of them possessed of a wealth of theoretical knowledge but rather innocent of the grasp and application of practical and well-established everyday methods. Two illustrations may better convey my meaning. On September 5, I was called in consultation by a man, I take it, of considerable native ability and several years experience in the practice of medicine. The patient was a young primipara, seven and a half months' pregnant, with symptoms of well-marked toxemia. She had been carefully watched and observations had been made. The history went back about three weeks, urine changing from normal quantity with a trace of albumin to a diminution of less than one-third normal output, boiling solid and filled with hyaline and granular casts. Blood pressure steadily and latterly rapidly increased from 130 to 160 and, when seen, 210. There was well-marked edema, persistent headache, pronounced insomnia and occasional blurring of vision. The young man's theoretic knowledge of blood chemistry and internal metabolism challenged my admiration; the laboratory had done its part in this respect, and yet, practically no attempt had been made to relieve the patient who was undoubtedly on the verge of an eclamptic seizure. Hospitalization and prompt, effective treatment began to show results for the better within six hours. Here we have an example which is not unique. The second example is as follows: I am at present interested in a young man, member of a large family with limited means, who is endeavoring to gain his medical degree from one of our prominent schools. In his high school course he maintained high rank. He has completed his first year in the premedical course, and by dint of working during the summer he is able to see his expenses provided for until after Christmas of the present year. If he attains the goal of his ambitions by his own efforts, it must be at a time well along toward middle life. This instance as you all know can be multiplied many times.

My experience with young graduates who have had a so-called one year clinical training—a few months in one place and then in another—is, that while this is better than no training at all, it is unsatisfactory in results, if they stop at that. This just and widespread dissatisfaction must in time result in improvement. How this is to be brought about I am unable to say. It seems to me that in some way the cost of time spent in securing the theoretic part of a medical education must be reduced, possibly by elective courses and the opportunity to take summer courses, to the end that students may begin hospital and practical work at an earlier age.



The nursing situation, as with many other phases of life and endeavor, appears to be passing through a period of unrest and evolution which is unsatisfactory to all concerned. Where, when, and how it will eventually become reasonably stable and satisfactory is, as yet, beyond the ken of anyone. Leaders of that profession seem to be at a loss in the matter, are uncertain in their aims and cannot foretell the outcome. In the meantime, the sick must be cared for. The nurses themselves are dissatisfied, and soon after graduation, we find a large number of them seeking social service and institutional positions. There appears to be a growing unwillingness to do bedside nursing. Something is wrong. It is too much to say that everything is all wrong in this respect as there are too many who are doing excellent work; otherwise we would be obliged to close our hospitals and call upon friends and members of the family to nurse the sick in their homes. Many young women of a type who formerly entered our training schools find industrial positions more attractive. We have more people, and, thus more ill people in this country. There are more hospitals,—all requiring nurses, and there is an increasing number of sick seeking hospital rather than home care. A given hospital finds it necessary to employ more nurses than was the case twenty-five years ago. The tendency has been to increase the requirements made upon pupil nurses before they attain their graduation. Undoubtedly, the standard of raw material applying to enter our training schools has, as a whole, deteriorated. This problem is too complex to allow of its being cleared up by any off-hand plan. I believe that two years training is ample for the ordinary nurse, and could be established to the advantage of all concerned. A nurse should be trained in all that pertains to keeping a ward or room in order, and the routine care of patients. That she should be called upon to do all of this work throughout her entire training, I do not for a moment believe. From experience we know that lay workers, who look upon much of the oft occurring routine as employment and without thought of being trained, can be utilized to advantage. The university education of four or five years may be essential to develop the types of nurses required as heads of training schools. It would appear that there must be at least two standards of training.

I have read the reports of our Committee on Maternal Welfare as they have appeared, with great satisfaction and approval. I believe that this Association is most fortunate in the personnel of this committee, and that we should give to each member our highest commendation for the excellent and far-reaching work which they have done. It would be an advantage to continue the present committee in office, and I would advocate it if they are willing to serve in this capacity. Such efforts as they are making are along the right lines. We may rest assured that accidents, morbidity, and mortality incident to child-

birth, will not be reduced to the possible minimum, and the best and safest form of obstetric care given to the women of our country as a whole, until the people—medical and lay—earnestly demand it.

When it is understood that 75 per cent of the disabilities and deaths due to childbirth are unnecessary and means taken to prevent such results, then we shall no longer be in the unevitable position in which we find ourselves today. Creditable reports state that annually at least sixteen thousand women in this country lose their lives in giving birth. It is probable that this estimate is too low.

Imagine for the moment a town of twenty thousand women inhabitants. Suddenly, some great disaster occurs wiping out sixteen thousand lives, injuring, and disabling the remaining four thousand. The front pages of our papers would be covered with a description of this tragedy; the resources of the national and local government would at once be put into activity in order to bring relief, and the world would look on in horror stricken amazement. And yet, because these casualties are spread out over the entire year, and this condition has existed for so many years, it attracts very little attention. We must remember that these women are not old and decrepit, the majority of them being young or in early middle life, many leaving young children motherless. The total loss is enormous and largely unnecessary.

The medical profession is not without responsibility in this matter, and it behooves us to set our own house in order, to encourage the improvement of obstetric practice, to find some means of discouraging the careless, incompetent practitioner whose obstetric results are habitually bad, and to enlighten the public, teaching them to demand better obstetric care.

Our present-day status is not a happy one to contemplate, but on looking back thirty or more years and comparing conditions at that time with the present, I think there is ground for much encouragement. The work of our Committee on Maternal Welfare has challenged the interest and cooperation of a wide medical and lay public.

Hospital facilities for the care of maternity cases are rapidly increasing. A perfectly equipped hospital plant in itself does not, of necessity, insure good results. In the main, maternity hospitals, and departments in general hospitals, are well supplied with competent attending staffs. It follows that more internes are given practical obstetric training, and that the lay public is beginning to realize the possibility of good obstetric care. There never has been a time in my experience when so many well-trained young men were seeking interne positions in obstetric hospitals. All this is very hopeful, but I am convinced that we should redouble our efforts.

From time immemorial attempts have been made to overcome or assuage the agony incident to childbirth. Herbs, especially the poppy, alcohol in various forms, and drugs, have been employed for this pur-

pose with only limited success. There has been and still remains a widespread belief that these attempts are wrong because they are held to contravene the divine decree concerning women in travail.

In the year 1848, Sir James Simpson began to use chloroform for this purpose. At once he was vehemently assailed from many directions, by fellow practitioners, the press, and from the pulpit. It is unnecessary to recall to you the history of the efforts and results along this line.

Ardent search has been made for some agent or method which should be without danger to mother or child, simple in make-up and application, inexpensive and readily available, and yet which should not retard the progress of labor.

Making liberal allowance for personal interest and lack of perspective, time and experience but confirm my belief that the Lying-In Hospital, in New York, by its development and use of morphine and magnesium sulphate hypodermically, together with the rectal instillation of ether and quinine, has come nearer to meeting these requirements than any other procedure thus far known. I am now convinced that this marks one of the great advances in obstetric practice.

It is inconceivable that too much credit can be given to Dr. James T. Gwathmey who initiated this work, under our direction, in the Lying-In Hospital, in February, 1923. He gave freely of his time and great knowledge of anesthetics, not only in the hospital but also in laboratory research.

We have been taught that quinine is not absorbed through the rectum. Occasionally ignorant women who had been subjected to this treatment reported slight ringing in the ears. Urinalysis from fifty different women revealed the presence of quinine in forty-five.

From time to time articles have appeared under the title "Painless Childbirth." In my opinion there is no such thing, and allowing for the uncertainty of prophecy, I do not believe there ever can be such a thing.

By the method to which I refer we have had several patients whose labors were absolutely painless from within half an hour after treatment was begun. We now have record of something over three thousand patients who have been given this treatment. During the past month, out of one hundred and twenty-three deliveries in our out-patient department, eighty-three were given this treatment with good results. I have yet to learn or to observe that any mother or child has been endangered by it.

For a time both in-patient and out-patient departments of the hospital became a clinical laboratory. By reports from patients and observation by nurses, internes, and the attending staff, we have been able to check up results. We began with combinations and doses so small

that no result was expected. Cautiously working up from these—eliminating that which promised to be useless or harmful, fortifying where necessary and safe—we have arrived at a simple standard of dosage and technic which may yet be modified in minor details, but cannot be changed materially in principle.

Where skepticism and indifference were present in our early experience, we now have enthusiastic teamwork in carrying out this treatment.

44 PARK AVENUE.

## AN INQUIRY INTO THE NATURE OF CHRONIC APPENDICITIS\*

BY ARTHUR E. HERTZLER, M.D., HALSTEAD, KANSAS

NOTHING is more confusing than the generally accepted notion of the pathology of the appendix. The whole subject is suffused with assumption and bad logic. While acute appendicitis is more completely worked out than any other intraabdominal lesion, chronic appendicitis, so-called, has no definitely established pathology.

The purpose of this paper is to examine the morphologic basis of chronic appendicitis and to inquire as to whether or not the clinical experience is in harmony with existing theories.

*Material Employed.*—Before an attempt is made to interpret pathologic changes in any tissue, it is necessary to secure a clear picture of the normal structure of the organ. With this object in view, I examined (some twenty odd years ago) 1187 cadavers of subjects dead of some disease not involving the abdominal organs. Special attention was paid to the appearance of the appendix at the various age periods, both as related to its histologic structure, its position and the existence of alleged adhesions. I have examined in round numbers 2000 appendices obtained at operations, the majority from my own practice, so that the clinical as well as the anatomic data are available for my study. I have pursued this study when material presented, covering the life period from early infancy to the most advanced years. By this means it is possible to determine, in a general way, a normal appendix for a given age period.

The real background for my viewpoint was obtained at a time when I was pathologist to a hospital of considerable size, and it was my duty to find evidence of chronic inflammation in appendices removed by my employers under the diagnosis of chronic appendicitis. This was during a period subsequent to the extended anatomic study above noted.

This paper has to do with the specific examination of 500 appendices removed at the Halstead Hospital between August, 1919, and April, 1924. Many of these were removed during the course of other operations, notably pelvic operations and operations on the gall bladder. None, however, was removed as a routine measure but only when there was a history of groin pains or symptoms sufficient to impress some one of my hospital residents with a possibility of involvement of the appendix in the light of his teaching in his undergraduate course or in his internship before becoming a resident in the Halstead Hospital.

\*Read at the Thirty-eighth Annual Meeting of the American Association of Obstetricians, Gynecologists, and Abdominal Surgeons held at Hot Springs, Va., September 16, 17, 18, 1925.

In this way an independent diagnosis was obtained well up to the average in acumen and uncurbed by my own skepticism. A few were removed under the diagnosis of chronic appendicitis made by one of my assistants, and a number were operated on with the diagnosis of recurrent appendicitis in which the true diagnosis later became evident. A number of appendices were removed under wholly mistaken diagnoses as was revealed at operation or by the subsequent developments.

I have abstracted the case histories made by these residents, noted the gross appearance of the preserved specimens, and compared the slides with these in forming my conclusions. Whenever possible the after-course has been determined, particularly when no other lesion was found and the appendix appeared normal. The need of care in conducting the inquiry into the after course will be noted later. By checking these problems in these various ways, it is hoped that fairly reliable conclusions have been arrived at.

*General Consideration of Pathology.*—In the study of any tissue the subject of inflammation, it must be remembered that the term "inflammation" implies a local reaction to an irritant. It implies, therefore, a process and not a state. The failure to keep this obvious fact in mind is the fundamental error made by those who believe in the existence of a chronic appendicitis. A terminal fibrosis is not a chronic inflammation. Chronic inflammation in parenchymatous organs, it should be noted, does mischief only by strangling the parenchymatous tissue and not because of the fibrosis in itself.

A primal error made by many surgeons is in not distinguishing a relapsing acute inflammation from an alleged chronic one. They speak of a chronic appendicitis when they really mean a recurrent acute process. With these I have no quarrel. Their conceptions are fundamentally sound. It is their misuse of technical terms that is at fault.

It is well to think of an inflammatory process as made up of three stages or states; the acute reaction, the stage of repair, and the terminal fibrosis. A chronic inflammation is a progressive hyperplastic process due to a slight but constant irritant. Acute inflammation is usually due to one of the pus-producing organisms, while a chronic inflammation is due to some other organism, such as tuberculosis, syphilis, actinomycosis and the like, or to attenuated organisms of the pus-producing group. In these lesions the inflammatory process progresses indefinitely and is, in reality as the term implies, a progressive chronic process.

With these preliminary remarks, we may proceed to look at the condition as found in the appendix.

*Anatomy.*—The appendix is a lymph organ resembling the tonsil more than the remainder of the intestinal tract. It differs from the intestinal tract chiefly because the submucosa is not separated from



the mucosa by a definite limiting membrane. This permits lymph cells to diffuse into the submucosa without encountering a continuous barrier. The result is that there are no sharply defined lymph follicles, but the border is formed by scattered lymph cells. The presence of cells in the wall of the small intestine and its mesentery, independent of lymph follicles, has been sufficiently described. They are found in all ages and in most animals. These are found particularly about the vessels in the mesentery as I have noted elsewhere. This relation to the lymph cells and to the fixed tissue cells is difficult to determine. These cells are often regarded as evidence of chronic inflammation. This is an error. The amount of connective tissue in the submucosa varies greatly. It naturally is more abundant and manifests its acidophilic character most strongly in the young when the lymph follicles are most prominent. Both factors lessen with the age of the individual. It is less in the corpulent. The muscle coats likewise are most prominent in the young and suffer malnutrition in the aged and the corpulent. Fatty deposits in the subserosa bear a general relation to the habitus of the individual and but little to his past diseases. The vessels in the submucosa and particularly in the serosa are more thickened in the ptotic individual. For a full consideration of this problem I refer to the chapter on "*Varicosities of the Peritoneum*" in my book on *The Peritoneum*. The presence of a large number of goblet cells and the partial loss of the surface epithelium is often spoken of as a catarrhal inflammation. The number of goblet cells varies, normally becoming progressively less with age, and the loss of the surface epithelium occurs readily in the ordinary technic of slide preparation.

What is commonly pointed out as a chronic reactive process, therefore, is nothing more than a variation of the normal. These facts account for extravagant estimates as to the proportionate number of appendices showing pathologic changes. An organ which performs its function, if it has any, in complete harmony with the well-being of the individual, must be regarded as normal. For instance, every thyroid gland shows morphologic pictures which, when emphasized, are pathologic. Yet it would but confuse to say every thyroid is pathologic because it does not fit the picture in the freshman's histology.

Before considering chronic appendicitis it is necessary first to consider the acute variety and to study in some detail the terminal processes in its recovery.

*Pathology of Acute Appendicitis.*—When the appendix is the subject of acute inflammation, a definite series of phenomena develop; bacteria gain access to the lymphoid tissue and there set up a reaction. Just how they gain entrance is by no means clear. Probably in most instances they gain entrance through an injured mucosa since the primary foci seem to be most frequently situated between the lymph follicles. In some instances the primary lesions are within the fol-

liele and, since these not infrequently follow close on an attack of acute tonsillitis, it is easy to believe the appendiceal infection in these cases is blood borne.

Unfortunately in most instances the disease has passed beyond the stage when the exact location can be studied before the appendix is procured. Be this as it may, the end-result is the same. Hyperemia and swelling (due to the hyperemia together with the exudate of serum) and the collection of leucocytes rapidly take place. The immediate result of this is a distention of the coats of the appendix, and the stretching of the sympathetic plexus of nerves contained therein, which register their distress in the semilunar ganglia, and we have nausea and vomiting and a distribution of the sense of pain throughout the ramifications of the plexuses hence, generalized abdominal pain. In the

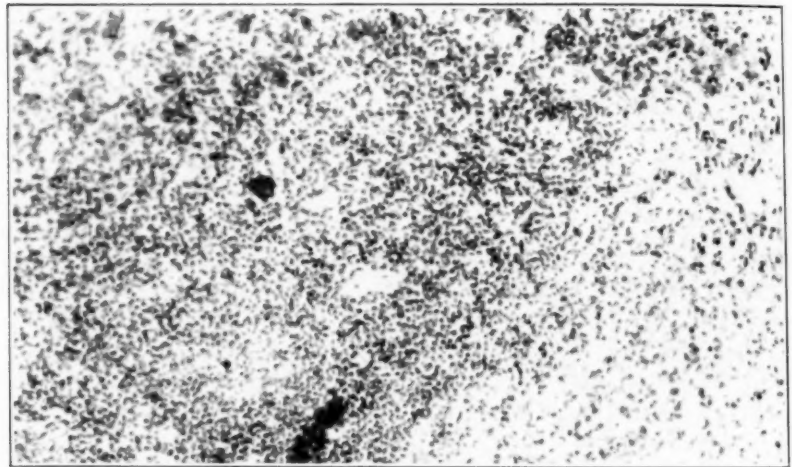


Fig. 1.—Round-cell infiltration in the border between the lymph follicles and submucosa.

course of some hours the reaction, begun in the lymph tissue, has reached the muscle layer and then the serosa, producing a periappendicitis. This irritates the parietal peritoneum, and we have localized pain and muscular rigidity. The reasons for these conclusions I have presented elsewhere. The clinical history is now complete.

I desire particularly to emphasize the earliest changes in a beginning appendicitis. The round cells and the fixed tissue cells are the first to respond to the irritant. The lymph follicles likewise respond (Fig. 1). The cells in the submucosa become swollen (Fig. 2) as do those between the muscle fibers (Fig. 3). This has to do, be it noted, with the first reaction. These are the cells concerned in the subsequent fibrosis. The polynuclear cells appear later. If the inflammation increases in intensity polynuclear infiltration occurs, the vessels become involved, abscesses form, the tissues liquify and perforation occurs, and a localized

abscess or a general peritonitis follows. If a considerable vessel is occluded, gangrene may result.

The reason the generalized abdominal pain ceases after the first day is because the nerves within the walls of the appendix are destroyed when the reaction becomes intense. Only in the lesser degree of in-

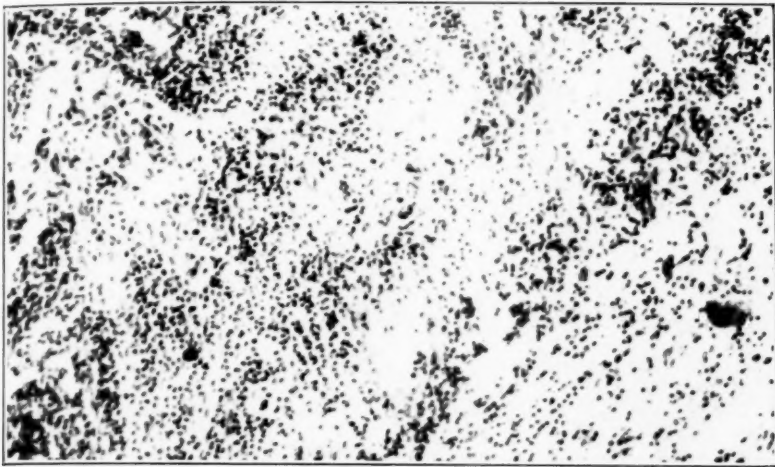


Fig. 2.—Round-cell infiltration of the submucosa.

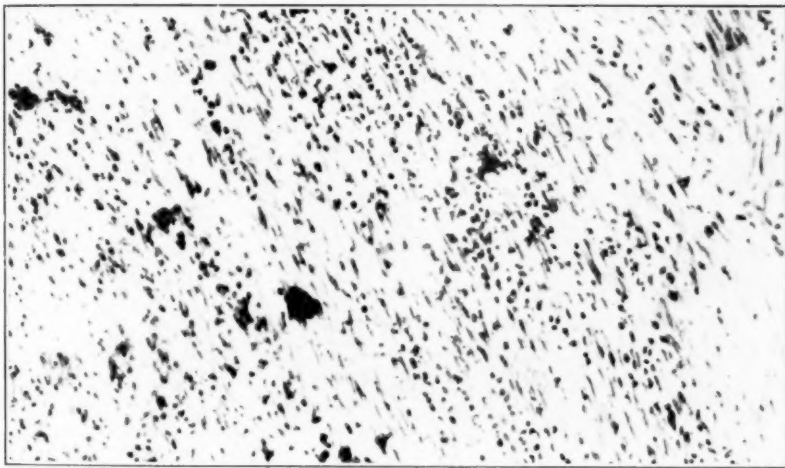


Fig. 3.—Round-cell infiltration between the muscle bundles. (Figs. 1, 2, and 3 from a patient 12 hours after the beginning of the fourth attack of appendicitis.)

volvement does the generalized pain continue. When a general peritonitis results, there is a generalized pain, but this pain is due to the involvement of the parietal nerves and not to the irritation of the sympathetic nerves. The significance of these very obvious observations is that the localized pain in appendicitis is not of the appendix itself but

of the parietal peritoneum or of the surrounding hyperemic but viable intestine.

*Terminal Processes in Acute Appendicitis.*—When regression begins after an acute appendicitis, restoration may be complete or partial. If the fixed tissue cells alone are irritated they return to normal, and the exudate is absorbed and restoration is quickly established. A moderate degree of polynuclear infiltration may regress without obvious change. We know that appendices removed after the subsidence of typical attacks may show no change. Material for such study was abundant during the time it was the general practice to remove the appendix in the interval for the purpose of preventing a recurrence of the attacks. When there is actual destruction of tissue, the matter is different. Parenchymatous tissue, actually destroyed, is not replaced

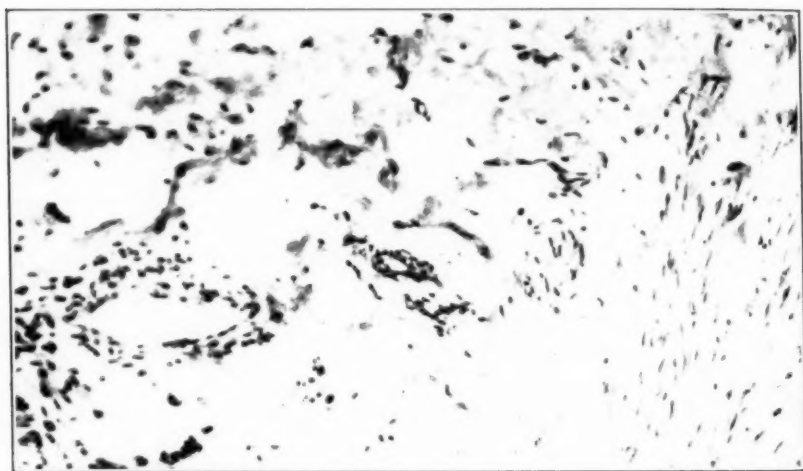


Fig. 4.—The lumen of the appendix is obliterated by the formation of fibrous tissue. (Last attack 4 years previous to operation.)

in kind, and some degree of scarring results. If the patient survives a gangrenous process the entire organ may disappear leaving only the mesoappendix to indicate its site. In lesser degrees the mucosa may be destroyed and be replaced by fibrous tissue which results in the obliteration of its lumen (Fig. 4), with less involvement of muscle bundles by fibrosis and a thickening of the vessel walls (Fig. 5). Examining some of these in detail, we observe (Fig. 6) an increase of the submucous connective tissue with dilatation of the vessels and a fibrosis of their walls. In some areas a regressing granulation tissue is seen (Fig. 7). Areas of definite fibrosis may replace the muscle (Fig. 8). The vessels of the subserosa may remain dilated (Fig. 9) giving a permanent redness to the organ, or the vessels may be larger (Fig. 10) appearing as distinct vessels to the naked eye. These last named changes, as I have fully described elsewhere, are most pronounced at

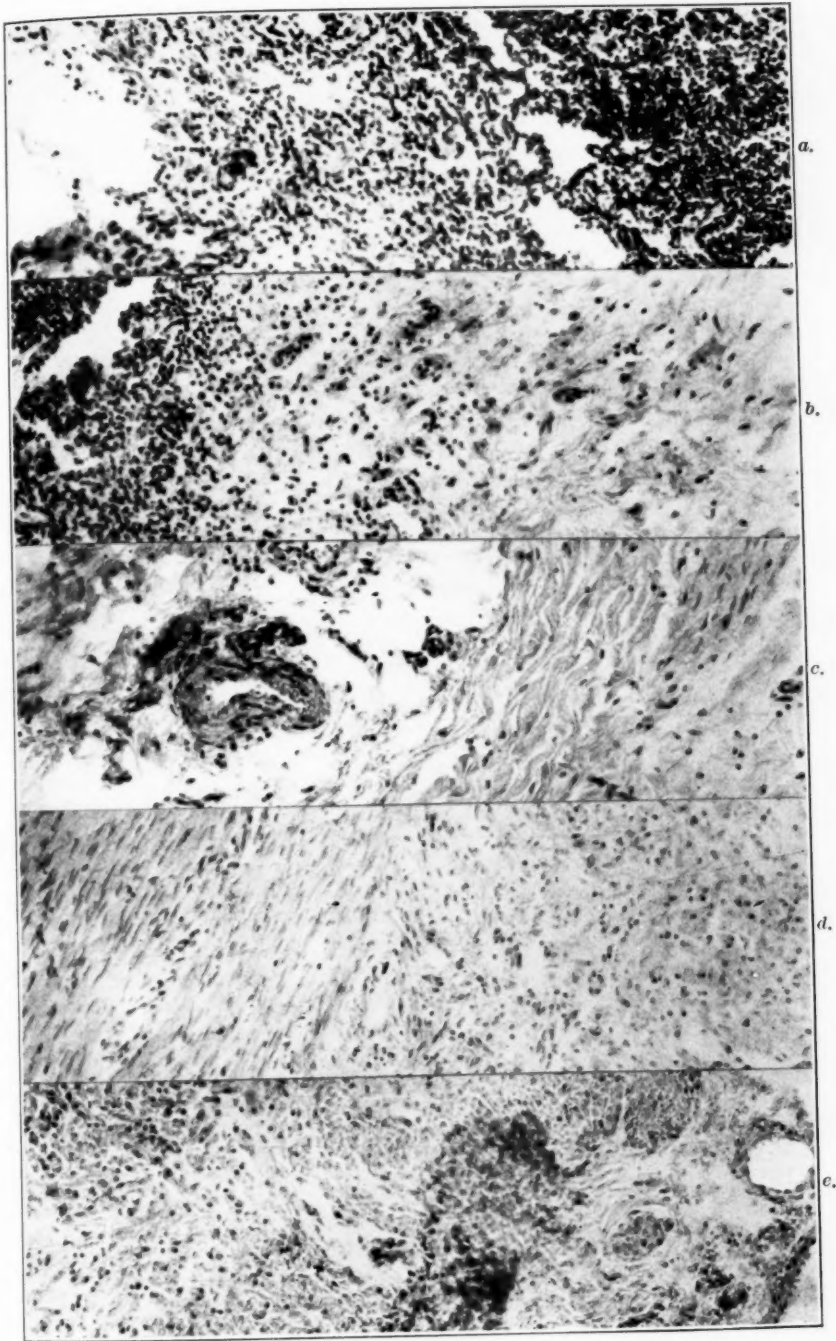


Fig. 5.—Section entirely across a healing appendix removed 21 days after the beginning of the fourth mild attack: *a*, the mucosa; *b*, border of mucosa and submucosa; *c*, submucosa and muscular layers; *d*, muscular layer; *e*, muscular layer and peritoneum.



some distance from the most intense reaction. These changes result in the production of the so-called Jackson's membrane.

Some or all of these changes may be found in appendices which have



Fig. 6.—Edge of lymph follicle showing walls of thickened vessels and increase in the fibrous tissue of the submucosa. (Appendix removed while repairing a scar hernia resulting from the drainage of an appendiceal abscess.)

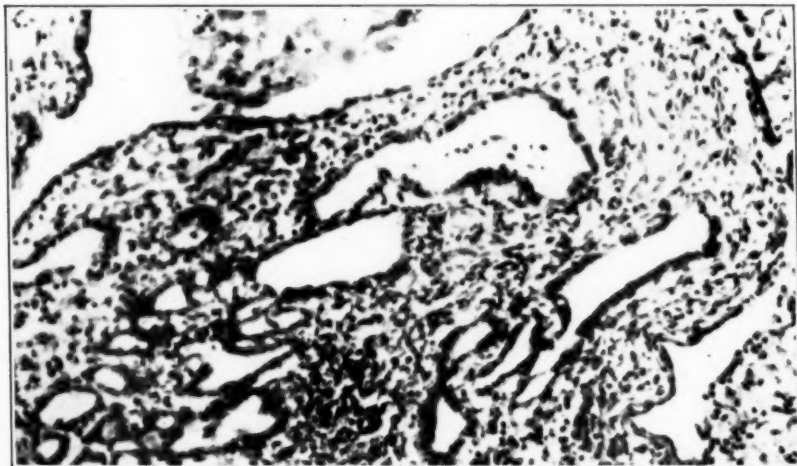


Fig. 7.—Chronic granulation tissue in the submucosa corresponding in histology to the pyogenic granulomas of the dermatologists. (Appendix removed 4 months after an acute attack.)

undergone inflammation, particularly in those the subject of repeated attacks. Generally speaking the healing process is completed in a few weeks, in the mild cases, and in two or three months in the severe cases when there is a loss of parenchymatous tissue substance. In rare instances this time is extended.



It is important to remember that such changes represent evidences of past inflammation but do not represent chronic inflammation in any proper sense of the term. It must be constantly kept in mind that such appendicæ were removed, not because they inconvenienced the

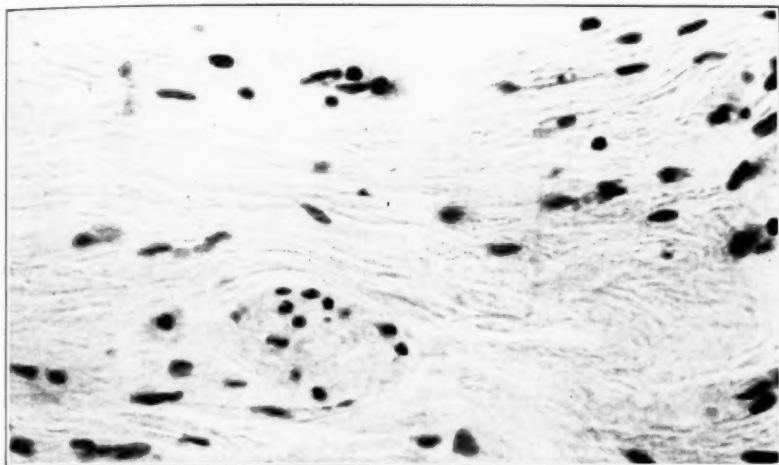


Fig. 8.—Fibrosis of the muscle layers, obtained while repairing a scar hernia.

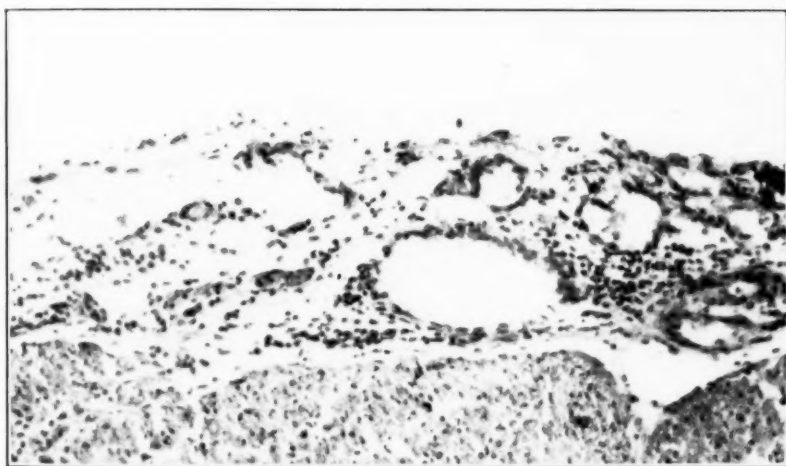


Fig. 9.—Dilated vessels of the subserosa with increase of the connective tissue. (Appendix removed 7 days after the beginning of the attack. A number of mild attacks had preceded.)

patient in the least, but solely to prevent a recurrence of the attack, or while repairing a scar hernia incident to the drainage of an appendiceal abscess, as was a common practice a generation ago.

*Chronic Appendicitis.*—I have examined the changes incident to acute appendicitis. I have reminded you that these fibrotic changes

noted in a healing or healed appendix are wholly without clinical symptoms. What then do we understand by chronic appendicitis? There being no pathologic evidence of a chronic appendicitis, we must determine what the clinicians have called "chronic appendicitis" and argue from his premises. We must assume, therefore, that Jonah did swallow the whale and then proceed to examine into the deglutitory and digestive problems involved.

Intermittent pain in the region of McBurney's point together with localized tenderness on pressure may fairly be stated to be the fundamental symptoms upon which the diagnosis depends. This applies obviously only to patients who have not already had their appendices removed. Digestive disturbances with localized pains, as above noted, would be required by some surgeons. "Epigastric dis-

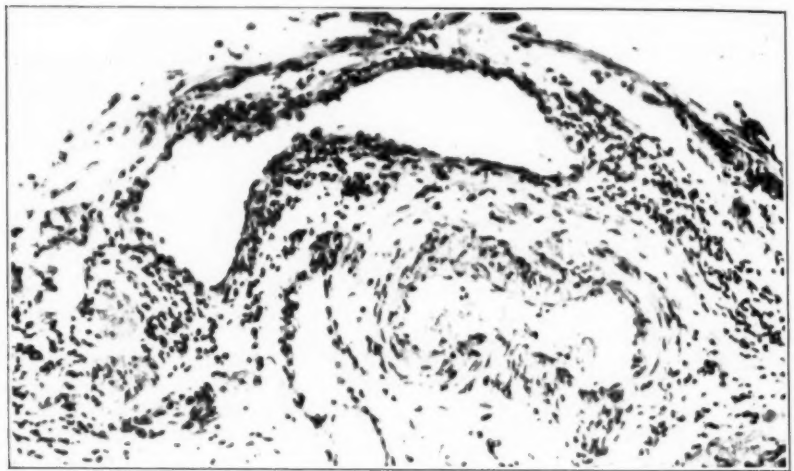


Fig. 10.—Dilated vessels of the subserosa. The inflammatory process has not yet fully subsided. (Same as Fig. 9.)

turbances, plus tenderness in the appendiceal region equal chronic appendicitis" is an unfortunate aphorism that has gone around the world.

This may be presented as a fair concept of the disease by those competent surgeons who make such diagnoses. I note with pain that a "model history" sent out by the American College has to do with a "typical case of chronic appendicitis." It is broadcasting from high places such as this that does the mischief. I would not hold them responsible for the fantastic plays of the imagination that have been indulged in by many. It is impossible to present anything like all the curious clinical symptoms that have been ascribed to chronic appendicitis. A few may be noted here. One writer records a "series of one case" of angina pectoris due to and relieved by the removal of a chronically inflamed appendix. Another recognizes a "chronic nervous appendicitis" and cured seven cases. The clinical picture he pre-

sents is "nervousness, headache, melancholia, irritability, insomnia, dizziness, general weakness, poor appetite, inability to think clearly and habitual constipation. I become afflicted with all these symptoms whenever I contemplate the picture of chronic appendicitis. Another reports a case in which a twist in the pedicle of an ovarian cyst was caused by a chronic appendicitis. Another presents as signs of chronic appendicitis intestinal atony, obstipation, anemia, nervous symptoms, and tenderness in the region of McBurney's point. Papers expostulating on the relation of chronic appendicitis to menstrual disorders are innumerable. One writer had six cases and rushes into print. Such citations could be multiplied indefinitely. The relation of chronic appendicitis to intestinal tract hemorrhages has been mentioned in several papers. One writer, for instance, reports fifteen cases. His diagnoses were made, it should be noted, by the x-ray, and the opinion was based on the fact that there was distortion of its caliber and course.

It is not my purpose to consider such lamentably puerile clinical logic. The only evidence adduced is that the symptoms complained of disappeared after the removal of the appendix. It is just such loose thinking, if you wish to call it thinking, that has made possible many of the operations we would like to forget. I may mention castration of females for almost anything; of males for prostatic enlargement; nephropexy for whatever ails you; Lane's kink for anything from constipation to breast cancer.

A few only of the more sane theories, if they be such, may be examined more seriously. I will consider first the relation of chronic appendicitis to gastric hemorrhage. In my earliest years I saw a young man who had epigastric disturbances and pain in the appendiceal region. I removed his appendix. He died from hematemesis. The autopsy showed that he had an ulcer. I had his normal appendix. Just imagine that some morning you were greeted by the announcement that fifty or a hundred of your patients had died during your absence. My entire surgical practice had died! In none of the cases reported that I have encountered was there evidence that any relation existed between the appendix and the hemorrhage. No case is even worthy of serious consideration that is not accompanied by a complete autopsy or examination of the stomach at operation. Even the absence of a demonstrable ulcer at operation would be insufficient to declare its absence. We know how difficult it is sometimes to find an ulcer even at autopsy. Even if ulcer does not exist there is no evidence that the appendix had anything to do with the hematemesis. In none of the reported cases was there even an attempt made to prove a relationship. Mine is the only case I know of in which there was any attempt to find out the facts in the case, and my patient had a definite ulcer and a normal appendix.

It is particularly in relation of so-called chronic appendicitis to

disturbances of menstruation that I have devoted my best efforts. Pain and tenderness in the groins are usually the only evidences that exist in these cases on which to base the diagnosis of appendicitis. Perhaps there may be digestive disturbances. The difficulty here lies not only in ignoring the anatomic findings in the appendix but in failure to recognize the fact that there may be ovarian pain without pathologic changes in the ovary. We may have headaches without diseased brains and we may have ovarian pain without diseased ovaries. I mention these very obvious facts because so frequently operators, not satisfied with the removal of the appendix, which evidently seems insufficiently diseased to cause the symptoms complained of, attack the ovaries. Here is where the doctrine of chronic appendicitis plays its havoc.

*Pathology.*—What do we find in the laboratory when we examine the appendices removed from this motley horde? During the years I served as pathologist to a hospital, appendices removed under the diagnosis of chronic appendicitis, I classified somewhat as follows: if accompanied by an ovary or two, it was from a dysmenorrheic young woman; if long and thin with prominent vessels in the serosa, the patient was a woman with retroflexion, or a male with poetic tendencies; if small with fat mesoappendix, a woman near the menopause; if normal in size with a fat mesoappendix accompanied by gallstones, I knew the surgeon believed there was some relation between the appendix and gall bladder disease, and so on down the line. What did the slides show? Nothing! But as an exhospital pathologist I know what one should find and must find—either them or a new job! Some exfoliation of the epithelium and some hemorrhage in the lumen, particularly if the operator is inexperienced. Diminution in the number of goblet cells (Fig. 11). This can be emphasized if the section is made near the lip of the appendix. Emphasize the large number of mononuclear cells in the submucosa (Fig. 12). Increase in the connective tissue of the submucosa, is particularly to be emphasized if the patient is no longer young. Spaces between the muscular bundles are widened (Fig. 13). To get the full effect of these muscle changes the warm specimen should be hardened in strong alcohol and sectioned in paraffin. Hyperplasia of the vessel walls may always be recorded with safety because the thickness of the appendiceal vessels has not yet been standardized. (The American College of Surgeons has not got to this yet.) This cannot be used in young subjects, but comes in strong in ptotic females and in old ladies with gallstones.

These are the alleged changes to which the symptoms of the patient complaining are supposed to be due. I have seen all these things in countless hundreds of patients who had had no abdominal complaints whatever. I believe they are normal appendices. I have made these reports just as other pathologists are making them today. Don't blame

the pathologists. Who wants to report a normal appendix when the head professor made the clinical diagnosis of chronic appendicitis?

As a reformed pathologist I haven't a particle of hesitancy in de-

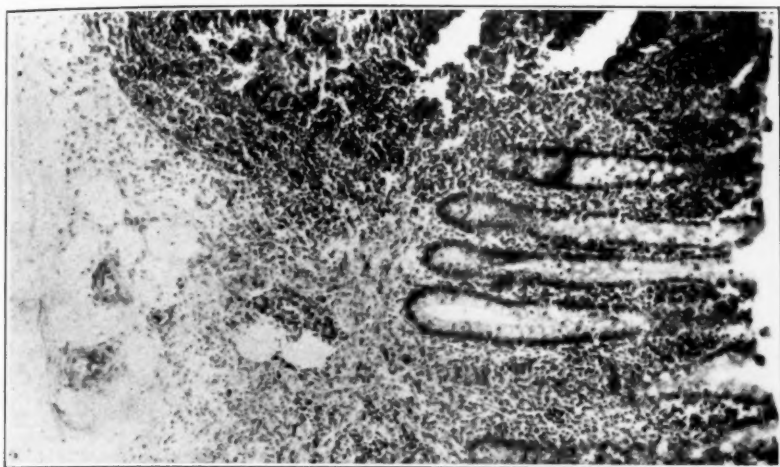


Fig. 11.—Normal mucosa and lymph follicles showing the indefinite line of demarcation between the latter and the submucosa. (Appendix removed by a competent surgeon as a chronic appendicitis. Pains recurred six months later. Patient then had a marked interstitial goiter. Both goiter and groin pains disappeared under treatment with potassium iodide and sodium bromide.)

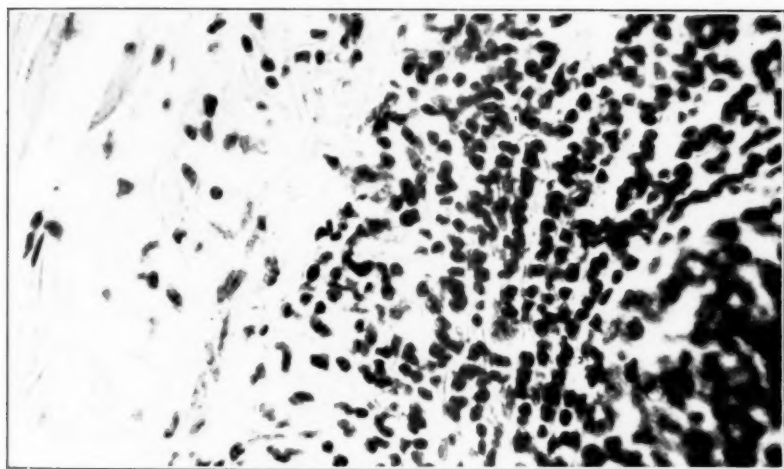


Fig. 12.—High power of the preceding.

claring that a pathologic basis for chronic appendicitis does not exist. The minimal changes noted by pathologists do not differ from those found in persons not complaining about anything. Those appendices in which changes are found to an unmistakable degree are found in



persons who have had an acute attack of appendicitis but who no longer have any complaints referable to the appendix.

It would seem the slight changes alleged to be found would test the credulity of any one. A few desquamated cells (Did you ever examine feces under the microscope?), a few round cells in the submucosa, increase of connective tissue (a relative thing at best). One must remember that no such minimal changes would produce symptoms in any other part of the body. All other abdominal organs are scarred vastly more without a symptom. Why should this vestigial remnant be the focus for so much evil? It must be something apart from any other known tissue. There is no evidence that it is. I can believe the pineal gland is the seat of the soul because there is no evidence of any kind

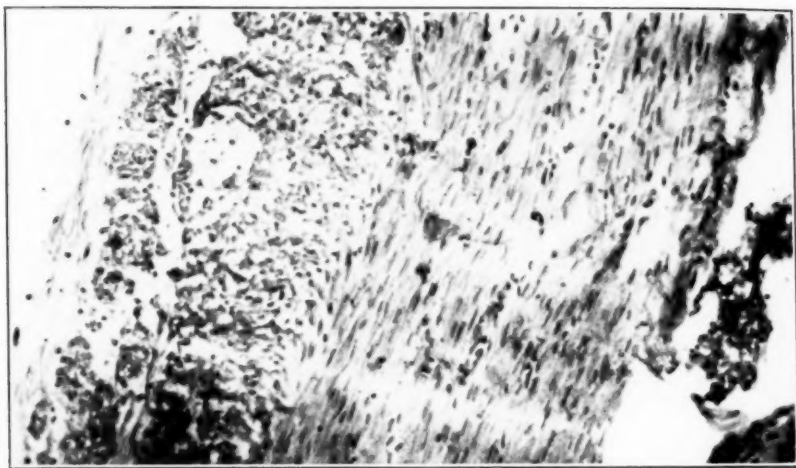


Fig. 13.—Increase in intermuscular spaces. (Appendix removed from an aged individual. No history of any abdominal complaint.)

regarding it, but that the appendix is the seat of so much mischief is incomprehensible because there is so much evidence to show that it is not true.

I wish to note that in rare instances there is a chronic granulomatous process in the appendix which is associated with indefinite abdominal pain and stomach disorders. I have seen three such cases. In clinical course and anatomic findings these differ much from the chronic appendicitis of common clinical parlance.

*Causes of the Symptoms of Chronic Appendicitis.*—As a pathologist I am utterly devoid of any knowledge that can clear up the problem of chronic appendicitis. As a clinician I am not so helpless. I have records of some 2000 patients who had pain and tenderness in the region of the appendix who did or did not have the appendix removed. It is the after course that counts here. In analyzing this material one must divide them into several classes:



1. Cases in which the removal of the appendix was followed by the relief of the pains formerly complained of.

2. Cases in which the pains persisted or returned, after an interval of freedom, after the removal of the appendix.

3. Cases in which the error in diagnosis became obvious later on.

4. Cases in which the groin pains were relieved without molesting the appendix.

Now let us consider each of these in turn:

1. Those in which the removal of the appendix "cures." Symptoms relieved by the removal of the appendix must have been due to the appendix is the gospel here. This is the one point on which the whole fabric of chronic appendicitis rests. It is a general experience that almost any sort of an operation will relieve almost anything for a time. The various operations done for epilepsy is a case in point.

In considering the results after the removal of the appendix, several other factors must be taken into account. Follow-up history by letter is of but little use because patients are prone to assume that symptoms they suffer from after the removal of the appendix must be due to some other cause. A careful history should be obtained from the patient as to the symptoms complained of before the operation was done and these compared with the symptoms still complained of. It is common to find patients declaring that their appendiceal symptoms were relieved by the operation but now they suffer from adhesions or from some other cause. One should also seek other changes in conditions since the operation. They may not have been relieved at once, but after bearing a child, or passing a kidney stone, or having a pelvic repair, the appendiceal symptoms may first have disappeared. The relation to associated events must be noted. Groin pains in lovers of either sex are relieved by appendectomy if followed soon by marriage or the administration of bromides. It is necessary to consider carefully the type of patient with which one is dealing. They are usually ptotic, neurotic, and subject to suggestion. Otherwise, they would not have chronic appendicitis. Mere alleged relief of symptoms in such cases is secured in many instances by the chiropractics. This fact alone should make us pause.

2. Commonly, particularly in dysmenorrheic young women, these symptoms, if relieved at first by the operation, later return. These patients observe that the operation did them no good. If not followed for a sufficient length of time, such patients may remain on our records as cured. Unfortunately this type of patient is apt to consult some one else because they feel the first one consulted failed in his efforts.

3. In some cases the same symptoms do not return but others develop which, together with the normal appendix in hand, is evidence sufficient to prove the error of the first diagnosis. A common example

of this sort is found in kidney stones and gallstones. The first symptoms may be indefinite and lead to the removal of the appendix. When the presence of stones becomes evident and one gets out his old slides a flood of light descends upon him.

4. Relief of the "Chronic Appendicitis" symptoms without molesting the appendix at all is the most impressive means of determining the value of the symptoms of a "chronically inflamed appendix." If one will follow the dictum that any chronic or persistently recurring pain in the right groin is not appendicitis and begin a careful clinical investigation, a removable cause will usually be found. I have elsewhere discussed the relation of these pains to ovarian dysfunction and need not repeat the discussion here. I have also mentioned the pains ardent wooers have. The same applies to seminal vesiculitis, many other diseases of the genitourinary tract, pyelitis, gallstones, spastic constipation and many others, not to mention the surgeon-patients who believe in chronic appendicitis, which is of course merely a hypochondria.

#### CONCLUSIONS

1. Fibrotic changes in the appendix, no matter of what degree, are not attended by clinical symptoms.

2. The anatomic structure of appendices commonly removed under the diagnosis of chronic appendicitis show no variation from the appendices of individuals suffering from no abdominal complaint whatsoever.

3. The minimal changes alleged to be present in cases of so-called chronic appendicitis are wholly inadequate to explain the symptoms ascribed to them considered in the light of like changes in other organs of the body.

4. Mere alleged relief after the removal of the appendix of symptoms is not sufficient to prove that the appendix was the cause of the symptoms.

5. The vast majority of patients so operated on do not even claim relief of their symptoms.

6. The symptoms alleged to be due to chronic appendicitis can be relieved by searching out the actual cause and by removing it, relieving the patient without molesting the appendix.

*(For discussion see page 247.)*

## INVERSION OF THE UTERUS\*

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**I**NVERSION of the uterus is an extremely rare condition. The lesion may have a gynecologic or an obstetric origin. The gynecologic inversions are due, in practically all cases, to a pedunculated myoma or sarcoma. The obstetric or puerperal inversions are complications of the third stage of labor. In this paper, the discussion will be limited to the puerperal inversions. These are classified as incomplete when the fundus of the uterus passes no further than to the cervix, and complete if any part of the corpus uteri passes through the cervical ring. In extreme cases inversion of the vagina accompanies that of the uterus. Most writers consider as acute all cases which have lasted one month or less, while those which have passed beyond this period are spoken of as chronic.

A review of the literature shows that this obstetric complication occurs on the average of once in 125,000 labors. Yates<sup>19</sup> feels, however, that since the statistics published are collected from the large and well-conducted obstetric clinics, the incidence is apt to be low in comparison to what it would be were statistics available for patients treated in private practice, in their homes, by men less skillful in the practice of obstetrics. With constantly improving obstetric practice, the lesion is gradually getting even more infrequent.

Although spontaneous inversion may occur, one of three factors is usually necessary for the production of this condition; namely, undue relaxation of the uterine wall, pressure from above, and traction on the funis from below. In addition the employment of the Credé expression on a relaxed uterus, or before placental separation, the erect posture in labor, a short cord, straining of the abdominal muscles during labor, coughing, sneezing, fundal implantation of the placenta, and the pressure of submucous fibroids during pregnancy are all contributory factors.

Since the placenta is usually inserted nearer the fundus in primiparae than in multiparae, and also on account of the greater vigor of the uterine muscle during a first labor, primiparae are more disposed to have this complication of labor. If uterine relaxation were the main cause of inversion, the lesion would be more frequent in multiparae where inertia is more commonly found.

Jones<sup>14</sup> described the active mechanism of inversion as follows: "After any portion of the uterus becomes indented to a considerable

\*Read at the Thirty-eighth Annual Meeting of the American Association of Obstetricians, Gynecologists, and Abdominal Surgeons held at Hot Springs, Va., September 16, 17, 18, 1925.

extent the rest of the organ seizes this invaginated portion as it would grasp a foreign body, and in attempting to expel it, turns itself inside out."

In the acute cases the symptoms are profound shock, hemorrhage, and pain. In the chronic cases one finds backache, bearing down pain,



Fig. 1.—Anterior colporrhysterotomy (Spinelli operation). The anterior vaginal incision has been made. The finger is separating the bladder from the cervix.

bladder and rectal tenesmus, anemia, resulting from the persistent loss of blood, and signs of low grade sepsis.

The diagnosis is made largely by examination. In inversions from obstetric causes there usually exists no difficulty. On inspection by means

of a speculum there appears a soft pear-shaped tumor filling the vagina. The covering of the tumor consists of the uterine mucosa; this may be dark red in color in the early cases, and grayish in appearance in the more advanced ones. On vaginoabdominal palpation no fundus is found, but there exists a cup-shaped depression in its place. The rectal

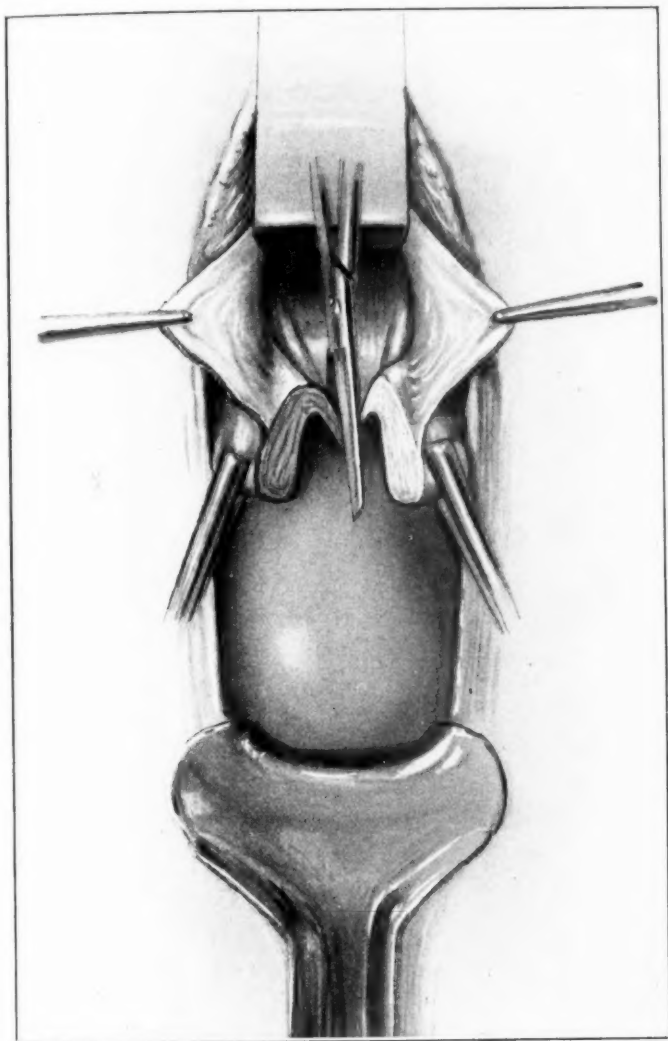


Fig. 2.—Anterior colporhysterotomy (Spinelli operation). The anterior vaginal wall has been incised; the bladder has been separated from the cervix; the peritoneal cavity has been opened, and the bladder is held under the retractor. The cervical constriction ring has been divided, and the incision is continued along the anterior uterine wall to the fundus.

examination is of great value in determining this depression. The indentation produced by inversion is characteristic of the condition, and is absent in other lesions from which it has to be differentiated.

In recent years the prognosis is gradually improving. The mortality has been about 34 per cent in the acute cases; in the chronic ones about 6 per cent. Some authors have quoted the mortality as high as 80 per cent, but this was before the days of aseptic surgery.

The treatment is nonoperative or operative. Jones<sup>13</sup> in an extensive study of the subject, has tabulated all the accepted methods of treat-

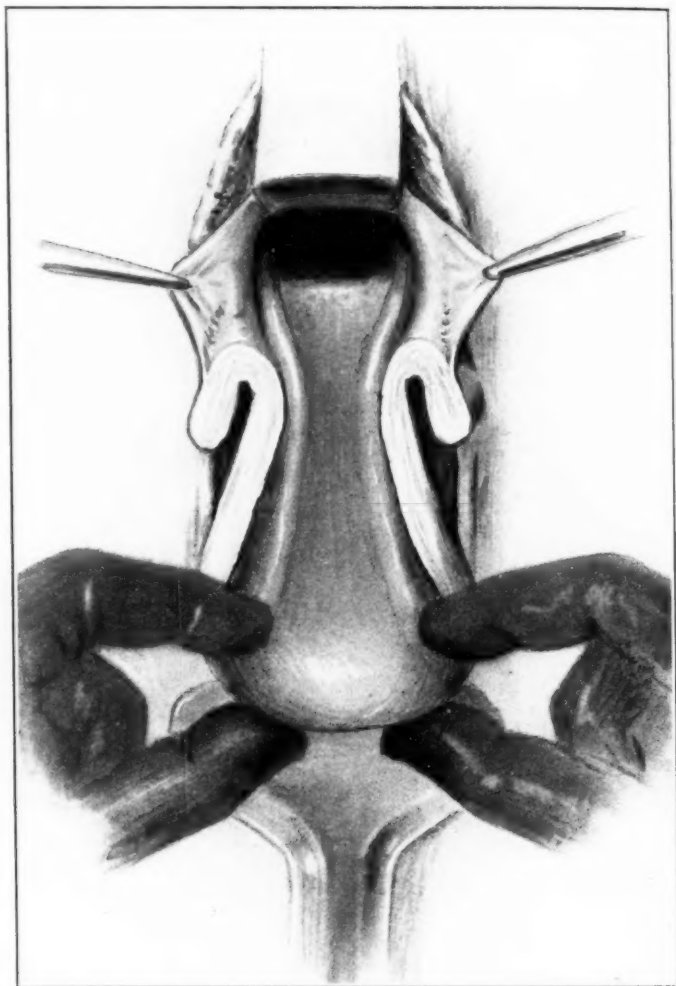


Fig. 3.—Anterior colpohysterotomy (Spinelli operation). The uterus is turned inside out. (After Crossen.)

ment, and Day<sup>6</sup> has well summarized the vaginal operations for chronic inversion.

Briefly the noncutting procedures are manual reposition, and pressure applied to the fundus of the uterus from below by means of colpeurynters, the gauze pack, and elastic pressure.



The operations performed for this condition may be abdominal or vaginal. The abdominal methods consist of dilatation of the constriction ring from above, and the reposition of the uterus from below with or without preliminary incisions, and abdominal hysterectomy. The abdominal operations are of special value in the recent cases which cannot be reduced by taxis.

In chronic inversions most operators choose the vaginal route. The operations consist of anterior or posterior colpohysterotomy in cases

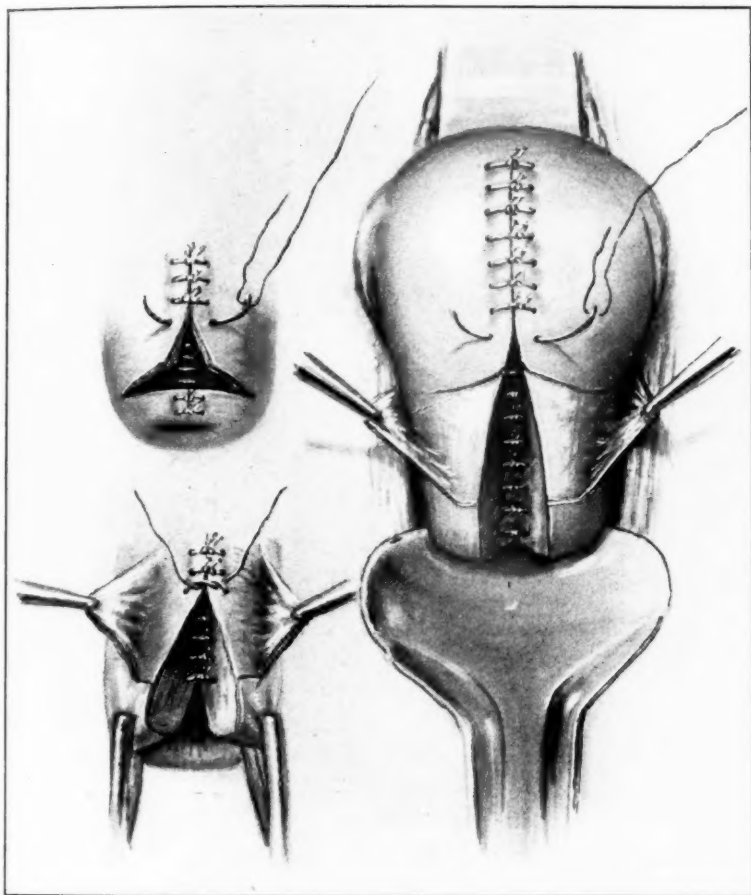


Fig. 4.—Anterior colpohysterotomy (Spinelli operation). The uterus is sutured in two layers with interrupted sutures of No. 2 chromic catgut. The vaginal incision is closed with interrupted sutures of the same material.

where the uterus can be saved, and vaginal *hysterectomy* where the opposite is true, and especially in the presence of gangrene of the uterine body. The names of so many operators are attached to these operations, which are all modifications of the same principles, that to mention them all is not possible in a short paper of this type. The

principles involved are incision of the vagina, of the constriction ring and of the uterine body, either anteriorly or posteriorly, the reinversion of the uterus, and the suturing of the incisions. Those who favor the posterior incisions, posterior colpohysterotomy, do so on the grounds that there is no danger of injury to the bladder and ureters by this procedure. On the other hand, exposure of the uterus and incision of the organ posteriorly is sometimes difficult, and again the sutured uterine incision is more likely to become adherent, leading to an adherent retroversion.

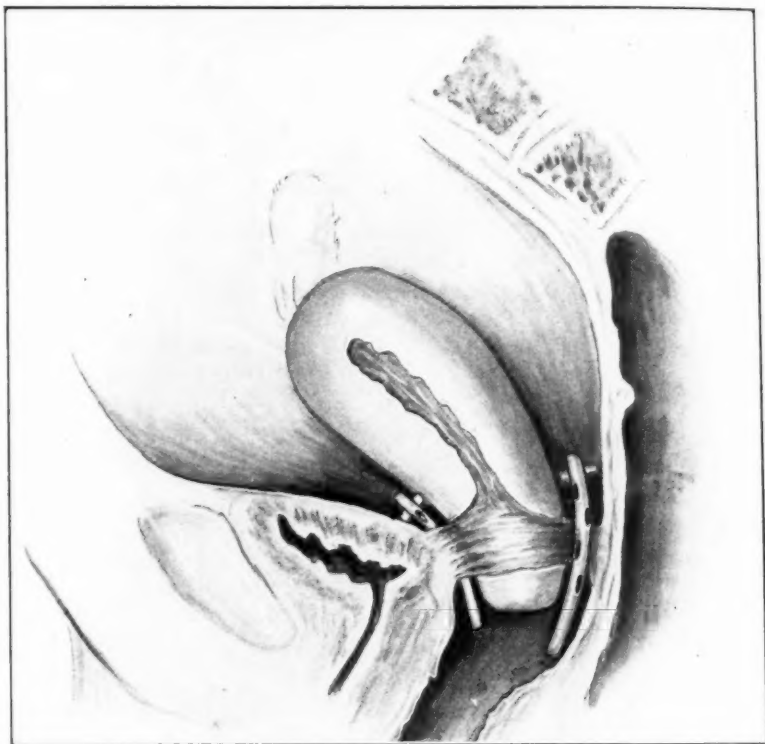


Fig. 5.—Anterior colpohysterotomy (Spinelli operation). Drainage established. Rubber tube drain in both the anterior and posterior culdesacs.

The objections to the anterior incisions, anterior colpohysterotomy, are injury to the bladder and ureters; yet this danger is almost negligible, and is not greater than when operating for an extensive cystocele. In the case which follows in detail and in which I did the anterior colpohysterotomy, the so-called Spinelli operation, no difficulty whatsoever was encountered in separating the bladder and in opening the peritoneal cavity. One striking advantage of this method is the fact that at the completion of the operation the anterior uterine incision is largely covered by the bladder, thus minimizing the possibility of subsequent adhesions.

Drainage should always be instituted, as the repaired uterus is considered as infected. Following anterior colpohysterotomy, anterior and posterior drains are usually employed. The anterior drain is placed between the uterus and the bladder, and allowed to make its exit through the anterior colpotomy incision, while the culdesac of Douglas is readily opened to place the posterior drain. The adherents of the posterior method only drain posteriorly through the vaginal incision already made.

Peterson,<sup>17</sup> in 1907, wrote in detail about the Spinelli operation, and reported a case with recovery.

Thorn,<sup>18</sup> in 1911, published a very exhaustive review of this subject and reported 641 cases gathered in the literature of the civilized world for the twenty-two years previous to 1911. In more recent years, Campbell,<sup>1</sup> Cohen,<sup>2</sup> Courty,<sup>3</sup> Culbertson,<sup>4</sup> Dantin,<sup>5</sup> Day,<sup>6</sup> Evans,<sup>7</sup> Fruhinsholz,<sup>8</sup> Huntington,<sup>11</sup> Jones,<sup>13, 14</sup> and Lorient,<sup>15</sup> have written on acute puerperal inversion and have reported cases.

Day,<sup>6</sup> French,<sup>8</sup> Gaudino,<sup>10</sup> Jensen,<sup>12</sup> and Miginiac,<sup>16</sup> have published their observations in regard to chronic puerperal inversion.

#### REPORT OF CASE

Mrs. M. D., aged twenty-seven, a secundipara, born in Massachusetts, was admitted in labor to the Carney Hospital, on June 26, 1924. She had had measles and pertussis in infancy; her tonsils and adenoids had been removed when she was seven years old. Menstruation was established at the age of fourteen; her periods were regular, every twenty-eight days, and lasted four days; two napkins were used daily and no clots were passed. Her last period had been on September 20, 1923, making her confinement expected on June 27, 1924. The patient had been married three years, and this was her second pregnancy. Her first child was delivered at eight months for toxemia and was stillborn. She had been well throughout the present pregnancy, and although albuminuria was present, no other signs of toxemia were observed. Her pelvis was ample.

The patient started in labor at 3 P.M. on June 26, 1924; two hours later the membranes ruptured spontaneously. She was given one-half c.c. of pituitary extract when her cervix was fully dilated. She was delivered by low forceps, of a female child, weighing 8 pounds and 6 ounces, by a member of the attending staff, at 7 A.M. on June 27, 1924. The placenta, which was inserted at the fundus of the uterus, was firmly adherent, and in attempting the Credé maneuver, the attendant inverted the uterus. The placenta was then peeled from the fundus of the inverted uterus; the organ was reinverted manually, without difficulty, and packed with sterile gauze. One c.c. of a sterilized preparation of ergot, was injected intramuscularly. Four ounces of ether had been administered during the delivery. One hour after labor the uterus was flabby and signs of a slow and persistent hemorrhage were observed.

I saw the patient at 11 A.M., four hours after delivery, while making hospital rounds. She was then pulseless, was bleeding freely, showed signs of air-hunger, and her condition looked desperate. At 11:30 A.M. she was given 1,000 c.c. of salt solution subpectorally. At 2 P.M. she was given a blood transfusion of 600 c.c. from her brother, by the citrate method. Her condition rapidly improved following this. She was discharged from the hospital on July 13, 1924, after an otherwise uneventful puerperium, by her obstetrician, who did not make a pelvic examination

at the time of discharge, and for this reason no note was made on the record as to the condition of the uterus. One week later I was called in consultation by her physician, who felt that he had discovered a uterine prolapse. I saw the patient in her home and because of the lack of aseptic conditions preferred to do the internal examination in the hospital and advised her to come there at once. My advice was not taken, however, for she did not report until July 29, 1924. Upon admission, the patient stated that since leaving the hospital she had noticed loss of support and weakness. Upon standing, the parts protruded through the vulva, and she felt more uncomfortable from day to day. There was a persistent sero-sanguinous discharge. For the two days previous to her admission there had been some bleeding, amounting to stains of bright blood on her pad; she had passed a small clot the day before entering the hospital. She had been free from pain, her appetite had been excellent, and her bowels had been regular with the aid of laxatives. There had been some difficulty and burning at micturition, but at the time of admission, there was only slight difficulty in starting the stream. The urine had not been observed to be bloody, cloudy or colored.

*Examination.*—On separating the labia, it was evident that a complete inversion of the uterus existed. The uterine mucosa was grayish in appearance, bled readily on sponging, and the typical cup-shaped depression was apparent on vagino-abdominal palpation. The cervical constriction ring was so tight around the uterus that it was impossible to reinvert the latter by taxis. The perineum appeared to have been recently repaired. The abdominal walls were considerably relaxed, otherwise the abdomen was normal. The heart and lungs were normal. The urine showed nothing remarkable.

*Operation.*—On July 30, 1924, thirty-four days after the accident, the patient had an anterior colporrhysterotomy (Spinelli operation) performed, under ether anesthesia. The uterus was exposed by the use of a weighted speculum, the edematous endometrium presenting. The cervical ring was grasped on either side of the median line by Jacob's vulsella and brought down into view. The anterior vaginal fornix was incised, the bladder was separated and held upwards by a retractor, the peritoneal cavity was opened, and the inverted funnel was exposed. No adhesions were found. The cervical ring was divided in the median line, and the incision was continued downwards along the anterior wall of the uterine body to the fundus. The uterus was reinverted without any special difficulty. The anterior uterine incision was closed by two layers of interrupted sutures of No. 2, chromic catgut, the first layer deep and the second superficial; the uterine wall was approximated without undue tension. The uterus was then replaced in the abdominal cavity, and free drainage was established by means of T-shaped rubber tubes, the first tube being placed between the uterus and the bladder, and the anterior vaginal incision being closed around it by means of interrupted sutures of No. 2, chromic catgut. A small transverse incision was made in the culdesac of Douglas and the second drainage tube was placed posterior to the uterus. The vagina was lightly packed with iodoform gauze, and the patient was returned to her bed in good condition.

*Convalescence.*—The patient had considerable postoperative nausea and vomiting, the evening temperature was 102° F., pulse, 118; respirations, 22; she was kept comfortable with small doses of morphia. July 31, there was a slight amount of distention which was relieved by enemata, the postoperative urine examination revealed negative findings; the evening temperature was 102° F., pulse, 120; respirations, 20. August 2, the iodoform wicks were removed from the vagina, the convalescence thus far was satisfactory. August 4, the two drainage tubes were removed. August 9, the patient was given a headrest; she was allowed out of bed on August 11. The discharge examination showed the uterus in mid pelvis, the drainage tracts were healed, and there was no pelvic tenderness. August 16, the patient was discharged well.

*Subsequent History.*—September 26, examination at the hospital showed the vaginal incisions and the cervix well healed, the uterus was in slight retrocession, the adnexa were normal and the patient had no symptoms. She had not menstruated in August, but had had a period, without pain, from September 1, to September 3.

December 31, the following history was obtained: she menstruated, without pain, in October, from the 20 to the 25; she had no period in November; in December she had a scanty period, without pain, from the 15 to the 18. The examination at this time showed nothing new except that the uterus was in second degree retroversion. The patient felt well and had gained thirty pounds in weight since her operation. On April 8, 1925, she was admitted to the Medical Service of the Carney Hospital; the examination of the lungs and the x-ray findings led to the diagnosis of chronic fibroid plithisis. Her periods had been regular up to the time of her admission. She was given appropriate advice for the treatment of her pulmonary condition and she returned to her home. July 25, 1925, her family physician reported that she was now living in the country; that her tuberculous process was arrested, and that she was gaining in weight.

#### CONCLUSIONS

1. Puerperal inversion of the uterus is a very rare condition. With constantly improving obstetric practice it will become even less frequent.

2. The predisposing causes are inertia of the uterus, pressure from above, and traction on the cord from below.

3. Shock is the leading symptom, and when this occurs after the third stage of labor, uterine inversion should always be borne in mind.

4. In acute cases the uterus should be reinverted, manually when possible, as soon as the condition is discovered. In cases where this is not possible, laparotomy and reposition by taxis seem to give the best results.

5. Chronic inversion is well treated by the vaginal method; anterior colpohysterotomy (Spinelli operation) when the uterus can be saved, vaginal hysterectomy when the opposite obtains.

6. The shock should be combated by blood transfusion before attempting the operative procedures.

7. The obstetric future of the woman who has had the Spinelli operation should be that of one delivered by a previous classical cesarean section.

#### REFERENCES

- <sup>1</sup>Campbell, Farquhard: Jour. Am. Med. Assn., 1921, lxxvi, 1396.
- <sup>2</sup>Cohen, J. P.: Boston Med. and Surg. Jour., 1922, clxxxvi, 352-357.
- <sup>3</sup>Courty, L.: Bull. Soc. d'Obst. et de Gynéc. de Paris, 1925, No. 2, 158-159.
- <sup>4</sup>Culbertson, Carey: Surg., Gynec. and Obst., 1920, xxx, 315-316.
- <sup>5</sup>Dantin: Gynec. et Obst., 1922, vi, 310-312. Abs.: Jour. Am. Med. Assn., 1923, lxxx, 435.
- <sup>6</sup>Day, Hilbert F.: Boston Med. and Surg. Jour., 1912, clxvii, No. 11, 361-364.
- <sup>7</sup>Evans, E.: Surg., Gynec. and Obst., 1923, xxxvii, 461-465.
- <sup>8</sup>French, Ralph W.: Jour. Am. Med. Assn., 1923, lxxxi, 1598-1600.
- <sup>9</sup>Fruhinsholz, A.: Bull. Soc. d'Obst. et de Gynéc. de Paris, 1925, No. 3, 257-258.
- <sup>10</sup>Gaudino, M. T. F.: Semana méd., 1924, ii, 227-230. Abs.: Jour. Med. Assn., 1924, lxxxiii, 1112.

- <sup>11</sup>Huntington, J. L.: Boston Med. and Surg. Jour., 1921, clxxxiv, 376.  
<sup>12</sup>Jensen, W. W.: Jour. Am. Med. Assn., 1920, lxxv, 310.  
<sup>13</sup>Jones, Walter C.: Surg., Gynec. and Obst., 1913, xvi, 632-650.  
<sup>14</sup>Jones, Walter C.: Am. Jour. Obst., 1914, lxix. (Contains complete bibliography.)  
<sup>15</sup>Loriente, H.: Rev. méd. d. Uruguay, 1920, xxiii, 371. Abs.: Jour. Am. Med. Assn., 1921, lxxvi, 556.  
<sup>16</sup>Migninac, Gabriel: Gynéc. et Obst., Paris, 1923, vii, No. 1, 37-42.  
<sup>17</sup>Peterson, Reuben: Surg., Gynec. and Obst., 1907, v, 196-213.  
<sup>18</sup>Thorn, W.: Samml. klin. Vortr., Leipzig, 1911, No. 625 (Gynäk., No. 229), 101.  
<sup>19</sup>Yates, H. W.: Am. Jour. Obst., December, 1919, lxxx, 712.

395 COMMONWEALTH AVENUE.

(For discussion see page 252.)

## FIVE KINDS OF CHRONIC APPENDICITIS\*

BY ROBERT T. MORRIS, M.D., F.A.C.S., NEW YORK, N. Y.

**I**T is said that Chinamen all look alike to a man who first visits their country. After a while he learns that there are people of nine different racial types in China, each with its own language.

Almost any topic becomes enlarged and elaborated whenever men examine into its factors. At one time chronic appendicitis was chronic appendicitis to the physician as well as to the surgeon. We may now classify five different kinds of chronic appendicitis, each with a different history and with a separate meaning so far as the diagnostician is concerned. His prognosis in regard to any one of these five kinds would not apply to the other four.

The most frequent kind of chronic appendicitis is that which leads to the largest number of mistakes in prognosis and which furnishes a great group of worthless appendix operations. It is an irritative lesion belonging to normal involution of the appendix. All of the structures of the appendix gradually undergo replacement by connective tissue with the exception of the peritoneal coat, and most important of all, nerve elements. These remain to become pinched and irritated in the course of contraction by the connective tissue. It has been said that fibrosis is not inflammation.

Lord Bacon said, "Show me a man who can define and I will show you a god." Being somewhat modest, I shall not attempt to assume this position and, instead of defining, may at least describe fibrosis of the appendix as a process which incidentally brings about irritation of entrapped nerve elements. Grouped about these will be found new cells belonging to inflammation. This commonest form of chronic appendicitis as a rule does not lead at any time to acute infective appendicitis. It has very different meaning in connection with two separate groups of people.

When this normal involution process takes place in people past middle

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life there is apt to be disturbance of abdominal sympathetic ganglia including those which conduct digestive processes. Consequently removal of the irritated appendix sometimes gives brilliant results by putting to an end the complications which go with digestion disturbances. It is a different matter altogether when involution of the appendix occurs in young people. It then signifies a stigma of physical decline and it belongs with other stigmata which may be readily discovered on examination. We may find the short sternum with ptosis of abdominal viscera, a loose kidney, narrow costal angle, crowded teeth and one or more of many kinds of stigmata of arrested development. Removal of the appendix in young neurotics before middle life in cases of this sort may be not only worthless but harmful as a surgical procedure. The patient may continue to have the many kinds of physical disturbance which go with the endocrinology of that general physical condition.

The two chief diagnostic signs for fibroid involution of the appendix are so strongly marked that for the most part we need these two only for diagnostic purposes. Pain and tenderness are not at McBurney's point,—at the site of the appendix itself. They have moved over to another point altogether, to the site of the right fused ganglion of the lumbar sympathetic system. Deep pressure a couple of inches to the right of the navel and a little below brings out this hypersensitiveness of the right fused ganglion. I have seen many consultants make pressure over the appendix at McBurney's point and decide that the patient did not have a chronic appendicitis because there was no tenderness on pressure at that point. Tenderness at McBurney's point belongs to acute appendicitis. It is seldom present in chronic appendicitis.

On the other hand tenderness on pressure at this other point near the navel is not present in acute appendicitis. It belongs to chronic appendicitis. Please get that idea firmly fixed in mind for it is highly important.

If we find hypersensitiveness of the left fused ganglion or of other abdominal sympathetic ganglia it throws out our diagnosis of chronic appendicitis which goes with hypersensitiveness of the right fused ganglion only and very distinctly.

The other one of the two important diagnostic signs of chronic appendicitis is what I have called the "eider barrel sign." Percuss the left side of the abdomen and find a normal resonance such as would belong to the eider barrel in October. Now go to the right side of the abdomen; percuss that, and you will bring out a resonance suggestive of the eider barrel in March. What does this mean? It means that the innervation of the cecum and ascending colon have become so wearied with constant nagging from the irritating appendix that their walls remain relaxed and distended allowing the cecum and ascending colon to remain permanently distended with gas.

Having fixed in mind these two signs in the diagnosis of one kind of chronic appendicitis, we may apply them to the four other kinds, for these two signs belong with all kinds of chronic appendicitis apparently. A different set of conditions, however, hangs about each one of the other four kinds.

The next kind of chronic appendicitis in frequency of occurrence is also an irritative lesion. It relates to scar tissue following an attack of acute appendicitis. This scar tissue undergoes the same sort of contraction that it does in the course of normal involution of the appendix, sending an afferent impulse to a segment of the spinal cord and an efferent impulse to various abdominal ganglia with resulting digestive disturbances. Removal of the scar tissue in cases of this sort is frequently justifiable and with results which help to make surgery popular. We have in addition to the two chief signs of "scar" appendicitis the story of the patient relating to an acute attack. When I studied veterinary surgery under Professor James Law he said that it would be a great advantage to me in connection with general medical diagnosis because a cow could never deceive me with her answers to my questions. In these days, however, patients can usually give a fairly accurate account of an attack of acute appendicitis because the subject has been discussed about equally with the Volstead Act.

The third form of chronic appendicitis is really an infective lesion, the first two, which I have previously described, being irritative lesions and not infective. This chronic infective lesion may relate to low grade chronic inflammation of the mucous membrane of the adjacent cecum. It may relate to the presence of entozoa in the appendix. It may relate to low grade inflammation which has remained after one or more acute attacks of appendicitis. The two chief signs are those of chronic appendicitis plus the patient's history of acute attacks. Operation in these cases may be said to be always desirable, although we must be very careful about the use of the word "always."

The fourth form of chronic appendicitis belongs to lymphoid hyperplasia. This again is an irritative lesion. There is an abnormal increase in the lymphoid elements of the appendix and these by causing tension, irritate nerve elements and produce the two signs of chronic appendicitis.

In the first two kinds described, irritation of nerve elements is due to contraction of connective tissue. Here, however, it is quite the reverse and due to expansion of lymphoid tissue. Lymphoid tissue cannot expand within the tight peritoneal sheath of the appendix much more readily than one can open an umbrella before taking off its sheath, hence, an irritative lesion.

The set of conditions hanging about this fourth kind of chronic appendicitis will usually serve to classify it. The patients in general have the so-called lymphoid diathesis. They include the victims of

status lymphaticus and many with a history of hypertrophied tonsils and enlarged lymph glands. Removal of the appendix in these cases will not change the patient's diathesis because that belongs to hereditary entailment. Furthermore, we must always be on guard in these cases against the sudden operative accidents going with cases of status lymphaticus.

The fifth form of chronic appendicitis belongs with chronic congestion in association with chronic congestion of other parts of the bowel and relating largely to blood or lymph circulatory disturbances. The appendix in these cases is not specially congested, and the only reason for its giving out signs appears to depend upon the same mechanical factors as those in the lymphoid appendix. In other words the congested inner structures do not swell readily within the inelastic peritoneal sheath.

It is a question about introducing other defects of the appendix in chronic appendicitis classification. For example, we have recently been informed that as a result of embryonic defect small implants of endometrium may sometimes be found upon the appendix and these would be expected to swell along with swelling of the endometrium at menstrual periods of the patient.\*

Shall we include tuberculosis and malignant disease of the appendix under the head of chronic appendicitis? Perhaps it would not be fair to do so, although tuberculosis and malignant disease not infrequently have their origin in the appendix primarily and at the outset may have given the two signs of chronic appendicitis. This is particularly the case with malignant disease. When tuberculosis begins at the appendix it is prone to extend to other parts of the bowel so rapidly that the two chief signs of chronic appendicitis may not appear. I have myself been mistaken and have come across malignant disease of the appendix or tuberculosis of the appendix unexpectedly. As a matter of fact I have made all of the mistakes and have done all of the unnecessary operations which go with worthless appendix surgery, but I hope during the next ten years in practice to do fewer of these than I did in the first ten years of study of the subject.

114 EAST FIFTY-FOURTH STREET.

(For discussion see page 247.)

\*Sampson, J. A., Archives of Surgery, September, 1922.

## APPENDICITIS IN PREGNANCY\*

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IT is well recognized that appendicitis is a dangerous complication of pregnancy. From available statistics, it appears to be relatively uncommon, being present in about 1 per cent of pregnant women. It has also been estimated that 2.5 per cent of women having appendicitis are pregnant.

Practically all writers agree that the mortality in suppurative cases is high. In more than 600 cases collected from American literature and reported by Weaver, the death rate was about 30 per cent in those operated upon, and 80 per cent in the nonoperated cases. In the non-suppurative cases, the mortality was approximately 1 per cent in those operated upon and 4 per cent in the nonoperated cases. In 40 per cent of this number abortion or death of the fetus occurred.

We have been struck with the rapidity with which the acute cases progress and by the fact that perforation is almost always followed by a diffuse, spreading peritonitis, with little tendency to localization and abscess formation.

In most instances, the diagnosis is not difficult, but the symptoms may be masked by the discomforts which are sometimes present in a stormy pregnancy. In the presence of acute abdominal symptoms suggesting appendicitis, the complication of pregnancy should be disregarded, and early interference is even more urgent, if possible, than in the ordinary case.

In view of these well-established facts, we are strongly of the opinion that appendectomy should be recommended for those who have had attacks of appendicitis and have subsequently become pregnant. Even though they may have successfully passed through one or more attacks, the risk of a recurrence during pregnancy is too great to be disregarded. The operative results in the early months of pregnancy are apparently as good as they are in nonpregnant women and the danger of abortion very slight. In this series there are two such cases in which our advice was followed:

CASE 1.—(Service of Dr. Fisher.) Mrs. S., aged twenty-five, a primigravida, twenty-two weeks' pregnant, entered the Barnes Hospital, September 10, 1924. Her general health had been excellent, but for the past year she had been having abdominal symptoms which dated from an acute attack suffered at that time. There had been one other acute attack subsequently, diagnosed as appendicitis, and during

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this entire period she had not been entirely free from tenderness. She was seen following the second attack and operation advised. At this time she was pregnant. A third attack a few weeks later hastened her decision and she entered the hospital immediately. She had definite localized tenderness in the lower right abdomen and during a two-hour period of observation, the W.B.C. increased from 11,000 to 14,500. The temperature was  $37.6^{\circ}$  centigrade. There had been no nausea or vomiting with the present attack. Her pregnancy had been progressing normally. At operation (Dr. Fisher) the uterus reached the level of the umbilicus. The appendix was injected, firmly adherent, and behind the cecum. Its tip was fibrous, the proximal portion distended. It was removed in the routine manner. The adnexa on this side were deeply injected. The wound was closed without drainage.

Aside from considerable nausea and distention, she made an uneventful recovery and had no uterine contractions. She was discharged on the tenth day and subsequent delivery, at term, was normal.

CASE 2.—(Service of Dr. Fisher.) Mrs. O., aged twenty-eight, a primigravida, ten weeks' pregnant, entered Barnes Hospital, June 9, 1924. For several months, she had had pain in the right side, with several rather acute attacks, the last one two weeks before admission. Her temperature and W.B.C. were normal, this being a definite interval. Her pregnancy thus far had been uneventful. At operation (Dr. Fisher) the appendix was large, thickened, kinked at its mid-portion, and adherent to the cecal wall. It was removed in the routine manner. Aside from the pregnant uterus, the findings were negative. The wound was closed without drainage. The postoperative course was uneventful and she left the hospital on the tenth day. Her pregnancy continued normally, and she was delivered at term.

CASE 3.—(Service of Dr. Royston.) Mrs. V. H., aged twenty-six, gravida ii, entered the Jewish Hospital, September 17, 1923. She was three months' pregnant. For the past ten days, she had complained of marked nausea and vomiting and pain in the right lower quadrant. Although she had had a similar attack nine months before, the present trouble was attributed to her pregnancy. Her family and past history were otherwise negative. There had been a slight elevation of temperature four days before admission, but at this time the physical findings were negative, except for slight tenderness on pressure over McBurnley's point, without muscle spasm or rigidity. W.B.C. 7,000. Appendectomy was advised and done two days later.

The appendix was definitely involved in a chronic inflammatory process, but without adhesions. The wound was closed without drainage. The patient made an uneventful recovery and was discharged on the fourteenth postoperative day. The abdominal pain was relieved, but the nausea and vomiting persisted for some months longer. She had a normal delivery at term.

CASE 4.—(Service of Dr. Royston.) Mrs. E. H., aged thirty-three, entered St. Luke's Hospital, February 27, 1923, during her third pregnancy, for the treatment of a bilateral pyelitis following a multiple nasal sinusitis. One month before this she had a sudden attack of pain in the back and abdomen with no history of similar previous attack. She was examined with the cystoscope nine times over a period of sixty-five days and the kidney pelvis irrigated. During this period, on April 18, while still in the hospital she complained of sudden acute pain in the lower right abdomen, which radiated into the flank. There was local tenderness and muscle spasm on pressure. Temperature  $98.6^{\circ}$  F., W.B.C. 7,000. Appendectomy was performed on the same day (Dr. Mudd) and the appendix showed a dilated lumen, with definite evidences of a chronic inflammatory condition. The wall was thickened and the mucosa showed a leucocytic infiltration. She made an uneventful recovery and left the hospital May 6, 1923.

There was no threatened interruption of pregnancy and she was delivered at term.



CASE 5.—(Service of Dr. Royston.) Mrs. G. S., aged twenty-five, a primigravida in the sixth month of pregnancy, entered St. Luke's Hospital on November 20, 1923. Since the onset of pregnancy, she had had several attacks of pain in the lower right abdomen. These attacks were increasing in frequency and severity, but had never confined her to bed. When seen ten days before, at the beginning of her last attack, she had localized tenderness and muscle spasm, but a normal temperature and a W.B.C. of 8,000. On admission the W.B.C. was 11,000 and on the advice of Dr. Tupper appendectomy was done on the following day. The distal half of the appendix was thickened and obstructed and was covered with a Jackson's membrane. The wound was closed without drainage. Five hours after operation, she began having uterine contractions, which were controlled by morphine and ceased after a period of thirty-two hours. Her temperature was normal after the third day, and the convalescence uneventful until the eighth day when vaginal bleeding without contractions appeared. This ceased after two doses of paregoric and she left the hospital on the eighteenth postoperative day. She was delivered on February 12, 1924, labor being complicated by a marginal placenta previa. Mother and child had an uneventful course throughout the puerperium.

CASE 6.—(Service of Dr. Royston.) Mrs. D., aged thirty-three, gravida v, was two months' pregnant when she complained of dull pain in the epigastrium, later in the lower abdomen. The nausea present was attributed to gestation. She gave a history of chronic constipation for years and stated that during the preceding year she had suffered twelve attacks diagnosed as chronic appendicitis. Physical examination at this time revealed neither rigidity nor localized tenderness over the appendiceal region and the symptoms were attributed to a low seated, movable ovary of normal size, though markedly tender.

At the end of the twelfth week of gestation the abdominal discomfort became more severe with localized tenderness on pressure in the right flank. W.B.C. 8,000. Appendectomy (Dr. Link) disclosed a thickened, edematous, subacute appendix with some adhesions present. The wound was closed without drainage. There was no disturbance of pregnancy. Convalescence was uneventful. All abdominal symptoms were relieved.

When near term, the patient complained of dyspnea, cyanosis, edema of all extremities, with a blood pressure of 140/80. Electrocardiogram showed myocardial degeneration. All symptoms were relieved by bed rest and massive doses of digitalis. A normal child was delivered at full term and patient has since felt well.

The six cases outlined above illustrate the chronic or recurrent type of appendicitis, and the operative results should not differ from those obtained in similar cases uncomplicated by pregnancy. The following cases, however, clearly show the dangers of conservatism in acute cases and the necessity of immediate operation.

CASE 7.—(Service of Dr. Fisher.) Mrs. A. M., aged twenty-nine, was admitted to Barnes Hospital, June 27, 1922. She was a primigravida, fifteen weeks' pregnant and entered the hospital as an emergency. Without previous similar trouble, she was taken suddenly ill, about twelve hours before admission, with nausea, vomiting, and acute abdominal pain, first general and later localized in the lower right abdomen. On admission to the hospital she presented the typical picture of acute appendicitis, with a temperature of 38.5° centigrade and a W.B.C. of 20,000. The abdomen was rigid, with acute localized tenderness at McBurney's point.

She was operated upon immediately (Dr. Fisher). There was free fluid in the peritoneal cavity and the cecum was covered with fibrin. The appendix was tremendously distended and completely gangrenous. It was twisted at the base and covered with exudate. There was no apparent effort at walling off and the neighboring intestine was deeply injected. The appendix was easily removed and the



stump buried. The right adnexa were deeply injected. The wound was closed, leaving one cigarette drain. On examination, the appendix was completely necrotic and contained a large fecalith near the base. Her pulse and temperature came down promptly and she made a very satisfactory recovery, with no evidence of uterine irritation. She left the hospital on the tenth postoperative day. Pregnancy progressed normally and she was delivered at term without complications.

CASE 8.—(Service of Dr. Fisher.) Mrs. M., aged twenty-nine, entered Barnes Hospital, April 2, 1925. She was in the sixth month of her third pregnancy, and ten hours before admission, without premonitory symptoms of any kind, was suddenly seized with acute abdominal pain associated with nausea and vomiting. She had never had a similar attack, and owing to its severity, she was brought to the hospital as soon as possible. She was under observation there for two hours. Her temperature was only 37.6° centigrade, but the W.B.C. during this time increased from 14,000 to 22,000 and the abdomen was rigid, with acute localized tenderness in the lower right side. At operation (Dr. Fisher) there was free turbid fluid in the peritoneal cavity. The appendix lay to the inner side of the cecum. It was acutely inflamed, greatly distended, and covered with fibrin. The distal portion was gangrenous. Again, there was no effort at localization. It was removed and the stump buried. The pelvic organs were markedly congested on the right side. The wound was closed leaving two cigarette drains. The convalescence was complicated for a few days by uterine contraction, abdominal distention, and acidosis. Intravenous glucose cleared up the acidosis and small doses of morphine controlled the uterine contractions. Following this she made a rapid and satisfactory recovery, her wound healed nicely and she left the hospital on the sixteenth postoperative day. Delivery at term was uncomplicated.

CASE 9.—(Service of Dr. Royston.) Mrs. F. F., aged nineteen, entered St. Luke's Hospital, March 31, 1923. She was a primigravida, six months' pregnant and a few hours previously had suffered an attack of generalized abdominal pain. About seven months previously, she had a transitory attack of lower right abdominal pain, which cleared up promptly and did not suggest appendicitis. Two days before admission, she was taken ill with diarrhea, but had no nausea, fever, or leucocytosis. The following day she complained of generalized abdominal pain which became more severe and localized in the right lower abdomen. Her temperature was normal, but her pulse rose to 120. An emergency appendectomy was performed a few hours later by Dr. Seelig, who found free pus in the peritoneal cavity and a gangrenous appendix. There had apparently been no effort at walling off. The appendix was removed and the wound closed with drainage. The postoperative course was stormy, with numerous complications which finally resulted in her death. During the first few days, premature labor was threatened, but the uterine contractions were controlled by morphine. There was a persistent acidosis which was difficult to control and a pyelitis developed on the thirteenth day with a considerable temperature elevation. This did not clear up in spite of lavage of the kidney pelvis, and the patient finally presented the picture of a generalized infection. She went into premature labor on the forty-seventh postoperative day. The child of thirty-one weeks' gestation died in a few hours. The mother died of acute pulmonary edema the following day.

This case was unusual in that she apparently recovered from the appendicitis and peritonitis and withstood the operation, until other complications arose which caused expulsion of the fetus and her own death seven weeks later.

CASE 10.—(Service of Dr. Royston.) Mrs. J. G., aged twenty-two, primigravida, five months' pregnant, entered St. Luke's Hospital, February 26, 1923. She had been ill for five days previously with pain in the right upper abdomen which was attributed to the right kidney. The latter was palpable and tender and the urine contained many leucocytes and motile bacilli. During this period the temperature

and pulse were normal. The day of admission there had been an acute exacerbation of abdominal pain without nausea or vomiting, but it gradually became localized in the lower right abdomen, with definite muscle spasm. On admission the temperature was 103.4° F., pulse 130, and W.B.C. 11,000. There had been no previous similar attacks. She was operated on at once by Dr. Tupper who found pus in the peritoneal cavity with a gangrenous appendix and no evidence of any attempt at localization. The appendix was rapidly removed, without inversion of the stump and the wound closed with drainage. Severe uterine contractions began eight hours after operation which could not be controlled, and she was delivered of a five months' fetus one hour later. She did badly following this. Distention was marked and persistent. Temperature and pulse were elevated, and on the fifth day blood cultures showed the presence of hemolytic streptococcus. She died on the sixth postoperative day. Of these four acute cases, the first two were fortunately seen very early and although the appendix in each case had become gangrenous within the first few hours, there was no extensive peritonitis and they survived operation without aborting. In the other two cases, there had been symptoms which did not seem to warrant a diagnosis of appendicitis and they were not operated upon until a general peritonitis had developed. Probably the appendix was the cause of the original trouble and we are convinced that it is extremely dangerous to wait for more definite symptoms to develop, if the appendix is under suspicion at all. In comparison, the risk of early operation is almost negligible.

These four cases all illustrate again the usual failure of these infections to localize and the rapidity with which they spread. We feel that the most reliable symptom is localized pain and tenderness over the region of the appendix, while fever, leucocytosis, nausea, and vomiting are frequently absent in the early cases and appear only after the infection has begun to spread. Valuable time may be wasted in efforts at making a differential diagnosis. The increased vascularity and lymphatic dilatation are probably factors in predisposing to a generalized rather than a localized infection. When abortion occurs in the presence of infection, the raw uterine cavity and its gaping thrombosed vessels add tremendously to the dangers of spreading infection. After appendectomy, morphine is indicated to arrest threatened abortion. In order to avoid any weakening of the abdominal wall, we recommend opening the abdominal cavity through an incision which does not split or tear the rectus muscle, if possible. Any undue trauma to the wound or exploration of the abdominal cavity is particularly contraindicated. Simple drainage is much safer than a prolonged effort to find or deliver a difficult appendix.

In closing, let us emphasize the importance of early diagnosis excluding urinary tract infection, gaseous distention of the intestines, and various pelvic conditions, such as tender adnexa, which is probably not as frequent as generally thought, varicosities of the broad ligament, displacement of the adnexa, and the rather remote probability of gall bladder or duct disease; but the warning should be sounded that too much valuable time should not be consumed in a laborious scheme of differential diagnosis—if the appendix is suspected, operate.

WALL BUILDING.

HUMBOLDT BUILDING.

(For discussion see page 247.)

## PROLAPSE OF THE PLACENTA\*

BY M. PIERCE RUCKER, M.D., RICHMOND, VA.

I WISH to report an unusual case from the out-patient service of the Medical College of Virginia. The patient was a negro woman, twenty-eight years old, who had been delivered by a midwife seven times, without complications. There had been no abortions. The present pregnancy had been apparently normal. There had been no prenatal care. On June 28, 1920, she was returning home about 8 P.M. with a basket of clothes on her head. She suddenly felt faint and began to bleed. After she rested on the curbing for a while the faintness passed off. She then walked home, a distance of one-half mile, without difficulty. After getting home she began to have pains and the bleeding commenced again and continued until the placenta was expelled at 3 A.M. It was at this time that a call was sent into the Memorial Hospital. She was found in a pool of clotted blood, but she was no longer bleeding. The uterus was rigid and reached 2 cm. above the navel. The midwife exhibited the placenta in a basin. It was devoid of membranes except at one edge where there was a little tag about 3 by 7 cm. The midwife had severed the cord a few inches from the placenta. The attachment of the cord was eccentric. The fetal surface of the placenta was smooth and glistening, and there were no torn blood vessels. The maternal surface was apparently intact. It was somewhat lobulated. There was an oval area about one-fourth the total area of the placenta extending to the periphery, that was distinctly darker and firmer than the rest of the organ.

Shortly after our arrival, the mother began to have severe bearing-down pains almost continuously. The head was born at 3:50 A.M. Restitution was to the right. There was no laceration, and no anesthetic. The fetus, a female, was rigid with rigor mortis. It weighed 3175 gm. Ossification was complete. Nothing unusual was found at autopsy.

The mother had a normal afebrile puerperium except that involution was somewhat delayed. On the tenth day the fundus was still five fingers breadth above the symphysis.

The first case of this kind was reported by Loss, in 1672. A curious case is reported by Perfect to have occurred in 1766, in which a midwife found the placenta in the mouth of the womb and pulled it away, thereby breaking the navel string. A man-midwife was sent for who delivered a live baby by turning. Ross, in 1799, described a mar-

\*Read at the Thirty-eighth Annual Meeting of the American Association of Obstetricians, Gynecologists, and Abdominal Surgeons, held at Hot Springs, Va., September 16, 17, 18, 1925.

ginal placenta previa where more and more of the placenta became detached, and where the placenta was expelled through the os externum four hours before the birth of the child. Osiander reported three cases in 1832, two at seven months of uterogestation and one at four months. He gave the name *prolapsus placentae* to the condition, and was of the opinion that a placenta previa was a necessary antecedent to it. This view was generally held until the autopsy in Seanzoni's case showed that there had been a normal implantation of the placenta. Since then a number of prolapses of normally implanted placentae have been reported, most of which have occurred in twin pregnancies, preceding the birth of the second twin. Münchmeyer reported two cases of prolapse of a normally implanted placenta, one of which was a twin pregnancy, and the other in a woman with a well-marked flat, contracted pelvis. Larisch has recently reported a prolapse of a normally implanted placenta associated with hydramnion and transverse presentation. There seems to be a tendency in the modern textbooks to limit the term prolapse of the placenta to those cases in which the placenta has been normally implanted. Both Williams and DeLee take this view. This is justifiable neither etymologically nor historically. A placenta has as much right to fall out of the womb when it is situated on the lower uterine segment as when it is situated normally. Furthermore, it is quite certain that when Osiander used the term *prolapsus placentae* he had in mind placenta previa and thought that the prolapse could occur only when the placenta was in front of the fetus.

*Frequency.*—If the term be restricted to the normally implanted placentae the condition is exceedingly rare. Larisch says there has been no cases in the Breslau clinic in twenty years. Prolapse of placenta previa is not so uncommon. F. H. Ramsbotham cites a number of men who had seen several cases. L. Müller in his book on placenta previa was able to find this complication reported in sixty cases. Simpson in his memoir reported a total of 141 cases. Fifty-six of these were on record and the remainder were from notes furnished by colleagues.

*Etiology.*—The accident occurs in multipara in the large majority of cases. Among the sixty cases that Müller collected there was only one primipara. It is very prone to occur in premature labors as might be expected from its relationship to placenta previa. Osiander, Seanzoni, and Hohl noted it only in premature births. In 89 of Simpson's cases where these data are given, three occurred before the sixth month, five in the sixth month, nineteen in the seventh month, nineteen in the eighth month, and forty-three in the ninth month. The presentations as noted in ninety cases by Simpson were as follows: head fifty-nine, trunk or upper extremity twenty-one, breech six, and feet four times.

The first step in the prolapse of the placenta is, of course, the detachment. When there is a central placenta previa the detachment may happen as the cervix dilates. The mass then falls into the vagina or is

forced there by the pressure of the amniotic fluid. Hüter was of the opinion that standing and walking during labor pains favored a prolapse of the placenta. L. Müller thought that the presenting part could push the placenta loose from its attachment and out into the vagina. When the placenta is marginal the detachment of the placenta can be caused either mechanically by the uterine contractions, or by changes in the placenta itself. Prolapse of such a placenta may be prevented by pressure of the presenting part. If, however, as in Ross' case the head remains high or if there is a malposition there is nothing to prevent the prolapse of such a placenta.

In the cases of normally implanted placentae, the cause of the detachment is obscure. Toxemia has not been a prominent feature of the cases that have been reported, nor do the patients have the shock, and other symptoms we are accustomed to see ordinarily in cases of ablatio placentae. Lange, Spiegelberg and Schröder called attention to the fact that most of the prolapsed placentas occur in twin pregnancies, after the birth of the first child. It is possible that a sudden shrinking of the area of the inner surface of the uterus might cause the separation of the placenta. The escape of the great excess of amniotic fluid in Larisch's case might have played a similar rôle. The prolapse of the placenta, once it becomes detached, would be possible in twin pregnancies as cited by Lange, Spiegelberg, and Schröder, when the second twin does not quickly occupy the pelvic inlet. In Münchmeyer's first case the prolapse was possible because the large fetal head did not engage in the flattened pelvis. In Larisch's case the transverse position of the child allowed the placenta to prolapse.

*Symptoms.*—Hemorrhage is the outstanding symptom, in fact the only symptom, in these cases. It is usually the first symptom in the previa cases. When the placenta is located in the body of the uterus, the hemorrhage may not occur until after the labor is well advanced. In Larisch's case it did not occur until after the bag of waters broke. It may even be absent altogether. In neither of Münchmeyer's cases was there any bleeding before delivery and only the usual loss of blood afterwards. Simpson emphasized the fact that the hemorrhage ceased when the placenta was entirely detached. He was so impressed with this that he advocated the artificial extraction of the placenta in certain cases of placenta previa and actually practiced this method of stopping the hemorrhage in at least one case.

The diagnosis rests upon finding the placenta either in the vagina or entirely outside the body. The accident should be suspected in twin pregnancies when the fetal heart tones of the undelivered child are no longer heard. The only problem in diagnosis that prolapse of the placenta presents is the question of the location of the placenta. Larisch's reasons for believing that the placenta in his case was normally implanted covers the chief points in differentiation. They are (1) no



placenta found upon vaginal examination, (2) no bleeding before labor was well advanced, (3) free blood above the child, (4) the opening in the membranes was some distance from the placenta, and (5) no trauma to the placenta.

*Prognosis.*—The prognosis for the mother is not particularly bad. In fact the prolapse of the placenta seems to be of some benefit to the mother. In Simpson's time when about one out of every three mothers with placenta previa died, only one in fifteen with prolapsus placentae died, and of the eight deaths in his series only two died of hemorrhage. Of thirty-four mothers in Müller's series, only two died. The outlook for the baby is entirely different. In the first place the majority are premature and some even are of nonviable age. In the second place, delivery must quickly follow the separation of the placenta. Grenser puts ten minutes as the outside limit. The only hope then for the infant even if he be mature, lies in prompt delivery. In Nadler's case, he had begun to turn the baby on account of a placenta previa, when the placenta prolapsed, and fell over his forearm. An extraction was promptly done and the baby survived. In most cases the fate of the infant hangs on the promptness of his spontaneous delivery. Seanzoni knew of no case with a living child. In twenty-six of Müller's cases only six were living shortly after birth. Data concerning the infants were given in one hundred and thirteen of Simpson's cases, and of these thirty-three infants were born alive. It should be remembered that both Simpson's and Müller's cases were collected before the time of asepsis and in the early days of anesthesia. Furthermore only one-fourth of the maternal deaths in Simpson's cases were due to hemorrhage. The prognosis for the mother under modern conditions should be considerably better. Whether it proves to be so or not the number of modern cases is too small to determine. There were no maternal deaths in the five cases reported by Münchmeyer, Nadler, Larisch and myself. As to the improvement to be looked for in fetal death rate, it must be remembered that the great majority of these cases occur as a complication of placenta previa. With modern treatment of placenta previa this complication should not occur or if it does, only in the course of delivery. The fetal mortality, therefore, should be that of placenta previa. In the small group of prolapses of normally implanted placentae, the only improvement from the standpoint of the infant, that might be expected, would come from a more careful watching of twin pregnancies. In the five cases just cited only one baby was saved (Nadler's).

#### CONCLUSION

Prolapse of the placenta is usually a complication of placenta previa. It may, however, occur in exceptional cases, such as twins, malpositions, and disproportion between head and pelvis, when the placenta is normally situated.



The only symptom is antepartum hemorrhage. The diagnosis is made by finding the placenta of the undelivered child outside of the uterus.

The prognosis for the mother is not bad. On the other hand, it is exceptional that the baby is born alive.

## REFERENCES

- Barlow, James: *Essays on Surgery and Midwifery; with Practical Observations and Select Cases*, London, 1822, Baldwin, Cradock, and Joy, p. 273.
- Baudelocque, Jean Louis: *A System of Midwifery* (transl. from the French by John Heath), London, J. Parkinson and J. Murray, 1790, ii, 37.
- Collins, Robert: *A Practical Treatise on Midwifery*, Philadelphia, Haswell, Barrington and Haswell, 1838, p. 51.
- Comin, A.: *Ann. Soc. Méd. chir. de Bruges*, Sept., 1862, 2 sér. x., p. 275.
- DeLee, Joseph B.: *The Principles and Practice of Obstetrics*, Philadelphia and London, 1913, W. B. Saunders Company, p. 439.
- Golding, J. P.: *Dublin Jour. Med. Sc.*, July, 1873, lvi, 87.
- Gowers: *Lancet*, London, 1831, i, 119.
- Grenser, Woldemar Ludovicus: *Naegeles, Lehrbuch der Geburtshülfe*, Mainz, 1869, V. von Zabern, ed. 7, p. 730.
- Hamilton, Alexander: *A Treatise on Midwifery*, Edinburgh, Dickson, 1781, p. 273.
- Hecker: *Bayr. Intell.-Bl.*, 1871, p. 181.
- Henning: *Arch. f. Gynäk.*, 1875, viii, 337.
- Hohl, Antonius Fridericus: *Lehrbuch der Geburtshülfe*, Leipsig, 1862, W. Engelmann, ed. 2, p. 686.
- Hüter, C. Ch.: *Deutsch. Klinik*, 1852, iv, 557.
- James, Walter: *London Med. Repor. and Rev.*, May, 1828, New Series, vi, 411.
- De La Motte, Guillaume-Manquest: *Traite complet des accouchemens*, new ed., Paris, 1765, L. C. D'Houry. Obs. 321, 322, 323, ii, 940.
- Lange, Wilhelm: *Lehrbuch der Geburtshülfe*, Erlangen, F. Enke, 1868, p. 810.
- Larisch: *Monatschr. f. Geburtsh. u. Gynäk.*, 1924, lxxvii, 278.
- Lathrop, William H.: *Med. Rec. N. Y.*, 1885, xxviii, 540.
- Lee, Robert: *Med. Gaz.*, 1839, xxiv, 554.
- Loss, Fredericus: *Observationum medicinalium libri quatuor*, London, 1672, E. Flesher, obs. xxiv.
- Mende, L.: *Beob. u. Bemerk. a. u. Geb. u. gerichtl. Med.*, Göttingen, 1826, iii, 296.
- Müller, Ludwig: *Placenta Praevia*, Stuttgart, F. Enke, 1877, p. 209.
- Müller, P.: *Würzb. med. Ztschr.*, 1866, vii, 34.
- Münchmeyer, F.: *Arch. f. Gynäk.*, 1888, xxxiii, 486.
- Nadler, Jakob: *Schweiz med. Wehnschr.*, 1921, li, 854.
- Osiander, Joh. Friedrich: *Gemeinsame deutsche. Ztschr. f. Geburtsh.*, 1832, vii, 223.
- Perfect, William: *Cases in Midwifery, with References, Quotations and Remarks*, Rochester, T. Fisher, 1783, ii, 288.
- Ramsbotham, Francis II.: *The Process of Parturition*. First American ed., revised, Philadelphia, 1842, Lea and Blanchard, p. 340.
- Ramsbotham, John: *Practical Observations in Midwifery; with a Selection of Cases*, London, 1832, S. Highly, Cases 153, 154, 155, Part 2, p. 229 to 236.
- Ross: *Ann. Med. Edinboro.*, 1799, iii, 308.
- Schröder, Carl Ludwig Ernst: *Lehrbuch der Geburtshülfe*, Bonn, 1888, M. Cohen u. Sohn, ed. 10, p. 702.
- V. Seanzoni, Friedrich: *Lehrbuch der Geburtshülfe*, Wien, 1867, ed. 4, p. 566.
- Siebold, Ed.: *Nachgeburt. Monatschr. f. Geburtsh.*, 1855, vi, 258.
- Simpson, James Y.: *Month. Jour. Med. Sc.*, 1845, v, 158; *ibid.* 169.
- Smellie, William: *A Collection of Cases and Observations in Midwifery*, London, 1754, D. Wilson and T. Durham, ii, 310.
- Spiegelberg, Otto: *Lehrbuch der Geburtshülfe*, Lehr, 1882, M. Schanenburg, ed. 2, p. 373.
- Williams, J. Whitridge: *Obstetrics*, New York and London, 1903, D. Appleton and Company, p. 715.

(For discussion see page 252.)

# TREATMENT OF PLACENTA PREVIA BASED ON A STUDY OF 303 CONSECUTIVE CASES AT THE BOSTON LYING-IN HOSPITAL\*

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IN 1921 I reported a reduction in maternal mortality in placenta previa at the Boston Lying-In Hospital for the years 1915-1920 over previous years. This improvement was from 19 per cent, in 1895-1915, to 6 per cent, in 1915-1920, and was attributed to marked increase in treatment by conservative methods, the use of the Voorhees' bag and bipolar version, as against manual dilatation and immediate extraction. Other factors were contributory but this was the main one. Reference to the first five columns of Table I shows this graphically.

It will be observed that when conservative methods reached 57 per cent the mortality had dropped to 6 per cent. In concluding this report I predicted confidently that in the next five years when we should have treated 70 to 75 per cent of the cases (which seemed as high as possible in hospital practice) by conservative delivery from below, our results would be still better, and perhaps equal the German statistics of 3 per cent. I stressed our series of 12 complete and 43 incomplete previas delivered with bags or bipolar version without maternal mortality as a basis for this belief.

TABLE I

	PLACENTA PREVIA 303 CASES, MATERNAL MORTALITY 15%					
	ACCOUCHEMENT FORCE 152 CASES, MATERNAL MORTALITY 19%			BAG AND BIPOLAR VERSION, 151 CASES, MATERNAL MORTALITY 8.25%		
	'95-'00	'00-'05	'05-'10	'10-'15	'15-'20	'20-'25 + six months
Number of Cases	18	26	42	66	66	85
Maternal Mortality	17%	15%	24%	20%	6%	10.5%
% Cases Bag or Bipolar Version	0	0	2%	13%	57%	76 %
Number Maternal Deaths	3	4	14	13	4	9
Maternal Mortality Complete Previa				36%	18%	25 %
Maternal Mortality Incomplete Previa				9%	0%	6 %
Fetal Mortality				44%	48%	54 %

\*Read at the Thirty-eighth Annual Meeting of the American Association of Obstetricians, Gynecologists, and Abdominal Surgeons held at Hot Springs, Va., September 16, 17, 18, 1925.

The next five year period ended and was studied. I hoped to demonstrate conclusively that conservative delivery from below is the best method of treating placenta previa. I expected to do a bit toward checking the growing tendency to resort to abdominal section in these cases. It had always seemed the mark of a nonobstetrical surgeon to resort to section except in the very rare primiparous central previas. Reference to the sixth column of Table I shows that expectations were not realized. True, 76 per cent of our previas had been delivered conservatively from below, but our maternal mortality had risen from 6 per cent to 10.5 per cent. In complete previas it had risen from 18 per cent to 25 per cent. The fetal mortality had risen somewhat. The combined mortality in 151 cases by conservative treatment was 8.25 per cent as against 19 per cent in 152 cases delivered by radical manual dilatation and immediate extraction. The only honest conclusion I could draw was that conservative delivery from below is more than twice as safe for the mother as accouchement forcé in placenta previa.

That conservative methods from below are obtaining best results in this condition is not so certain.

A study of the literature makes it possible to state that we do not know what the mortality is in placenta previa treated by abdominal section. This in regard to all previas to say nothing of the mortality in the different groups dependent on the degree of previa. It has been stated as 2 per cent, again as 3.6 per cent, again as 5 per cent by German authorities; as 4 per cent by an American, and by others as much higher. Because of the relatively few cases we must feel that these are but estimates.

Hitschmann, who gives the cesarean mortality as 3.6 per cent, states that in general, delivery by bipolar version or bags has a death rate of 7.6 per cent.

I would call to your attention eight considerations bearing on treatment which have arisen as a result of this study. These are:

(1) The "Typical Placenta Previa Death." Briefly described it is as follows: Delivery is accomplished, the placenta out, ergot and pituitrin given, fundus held, cervix pulled down with hooks, inspected, found intact or laceration repaired to top, fundus, cervix and vagina packed or not as you choose, transfusion or not as indicated, patient in fair or good shape, prognosis good barring sepsis. One-half to three hours later bleeding, rising pulse or lower pressure, softening fundus; re-examine, intact cervical ring, pack or repack, ergot and pituitrin, transfuse or retransfuse—consider hysterectomy, condition too poor, sudden persistent softening of whole uterus, death. Not all previas die in this manner, but this happens often enough to keep up the mortality and discourage one with delivery from below. For many years I have sought a satisfactory explanation of this phenomenon without success, because it seemed to me that if we could eliminate cases dying in this

manner our mortality would be only the inevitable one due to neglect and occasional surgical accident. The usual explanation given is atony of the isthmus. For instance, R. T. von Jasehke says, "Half the deaths in placenta previa are due to the bleeding produced by the dilatation of the lower uterine segment during the third stage and immediately after." Hofmeier on the other hand denies this explanation and states that "there is little danger of hemorrhage resulting from the lack of contraction of the lower uterine segment." This divergence of opinion by authorities, together with the observation that the bleeding usually manifests itself after some interval, justifies my scepticism of this "atony of the isthmus" explanation of the "typical placenta previa death." Only this year have I had a satisfactory explanation. Dr. F. S. Newell, of Boston (with whose permission I quote this conversation), said that in talking with Dr. Wm. E. Caldwell, of New York, Dr. Caldwell told him that at autopsy he had observed the following pathology in certain patients dead with placenta previa: an intact or well-repaired external cervical ring, but above in the lower uterine segment a split at the placental site into the uterine musculature, permitting hemorrhage from large deep vessels and sinuses. I think this observation of paramount importance in a consideration of the treatment of placenta previa. It explains the interval before the appearance of bleeding noted above in the description of the "typical placenta previa death." As the uterus in its normal postdelivery contraction and relaxation, more pronounced in multiparous women as are most previas, contracts, the bleeding is checked; when it relaxes, bleeding occurs freely. It explains the observation that whereas transfusion before, during, and after delivery in some cases is as helpful as most writers state, in this group it seems to hasten the end; as blood is pumped into the arm and, keeping up pressure, runs out of the uterus. It explains why the pack does not control bleeding. As the pack is introduced, the uterus contracts and the bleeding stops; when the uterus relaxes, the pack is not against the deep, partially buried bleeding vessel.

(2) A second matter for your consideration is suggested by the following statement from Hofmeier. It is his opinion that in placenta previa the lower uterine segment is not the primary seat of implantation of the ovum, but that the presence of a portion of the placenta near the cervix is due to the widespread growth of the placenta or to a placenta reflexa. Because of this and because of the anatomic arrangement of the blood vessels there is no serious blood loss after delivery, even when there is no active contraction of the lower uterine segment. He continues, and this is the sentence I wish particularly to emphasize—"Only where the placenta has grown into the uterine wall is there danger of hemorrhage. In the latter case a Porro operation is indicated." To interpret this in another form he believes that it is only when pla-

centa previa and placenta accreta (or inereta) coexist that danger from the lower segment arises. But he fails to state and I fail to see how this can be predetermined. Coupled with this statement is my own opinion based on observation in the case room. I feel that there are a certain number of previas in which no method of delivery from below, either natural or artificial, will fail to rupture the lower segment in one way or another, open or concealed. In this group I believe a part of the lower segment is so invaded by placental tissue or so thinned out that it cannot fail to rupture if the fetal head comes through it. I believe, but do not know, both on theoretical grounds and by a very few observations that this is as likely to be true in partial as in complete previa. I believe that in marginal previa the statement above by Hofmeier regarding higher primary implantation is always true.

(3) The third consideration involves a critical discussion of the theory of bipolar version and the use of the Voorhees' bag in the treatment of placenta previa. We, as advocates of these methods of treatment, have insisted in our teaching that the *sine qua non* in the treatment of placenta previa is to obtain full dilatation without violence, or manual dilatation,—synonymous terms. We have insisted that bad results come because the attendant would not wait for the bag to dilate completely, or would insist on pulling the baby, gently of course, through the partially dilated cervix rather than wait for nature to push it through as the true Braxton Hicks' procedure calls for. One of my associates in the hospital who has an enviable series of successful deliveries by these methods still insists that this is true. Two years ago I agreed; now I doubt whether it is always true, though I still believe it too often is. These things make me question: (a) that in my previous paper I seemed to demonstrate that the danger of rupture lies in the last inch of dilatation rather than in the earlier part. In other words that rupture is caused by the after-coming head and not by the dilating instrument whether it be bag, breech, or fist. (b) That in bipolar version the dilatation obtained by the breech by nature, especially in premature babies who have a relatively smaller breech, is often not enough for the head, and when the head sticks and is picked out "ever so gently" rupture may take place. (c) That bag failure; i.e., failure of the bag to obtain full dilatation, does take place to the extent that nearly 50 per cent of the last five years' cases in this series are recorded as having a rim of cervix visible when the bag came out and labor stopped or bleeding occurred forcing immediate delivery by manual dilatation of the rim and "gentle version and extraction." The average fist never dilates the cervix completely, therefore, precisely the same condition as in (b) resulted with its inevitable toll of rupture from the dangerous last inch. That this bag failure occurs frequently is further emphasized by W. B. Thompson, reporting 66 cases of placenta previa in the first 10,000 deliveries at the Johns Hopkins

Hospital, who states without apology: "The use of the bag is routine at the Johns Hopkins Hospital. Because of the poor quality of the Voorhees' bag one seldom gets complete dilatation. When the bag is expelled therefore, the physician should finish dilatation manually and do a version and extraction or forceps, etc."

TABLE II  
CAUSES OF MATERNAL DEATHS

Hemorrhage and Shock .....	15
Hemorrhage and Shock, probably ruptured uterus.....	15
Undoubted Ruptured Uterus.....	6
Septicemia and Peritonitis .....	5
Pulmonary Embolus .....	3
Miscellaneous .....	3
Total Deaths in 303 Cases of Placenta Previa .....	47

(4) I would call to your attention Table II, which lists the causes of death in the 47 previas that died in this series of 303 cases. Unfortunately few autopsies were obtained; the causes of death as given, represent my interpretation of the records. You will first note without the burden of percentages that practically half probably died of ruptured lower segment, concealed or open. Then you will note that if the bulk had not died of hemorrhage or ruptured uterus or both, that on the law of averages four or five more would have died of sepsis in one form or another.

(5) Table I shows the maternal mortality rate in our complete previas. For fifteen years, by five year periods, it has run 36 per cent, 18 per cent, 25 per cent,—the last two figures under the most conservative treatment from below. I am open-minded about these figures and only ask, could they possibly be worse under any other method of treatment?

(6) Infant mortality. I have taught for many years that the baby in toxemia with convulsions and in placenta previa is a by-product. If you save it, so much the better; if you do not and save the mother, you should be satisfied. That no consideration for the baby should alter the treatment against the mother in conditions in which there is so high a fetal mortality in the nature of the disease, has been insisted upon. I still believe this in principle but I am questioning whether in placenta previa, by sacrificing the baby we are so often saving the mother per se. An analysis of fetal deaths in these five and one-half years, with its 25 per cent complete and its 10.5 per cent general previa mortality leads me to question this. Briefly this analysis shows that in 85 cases 46 infants died or were born dead, a fetal mortality rate of 54 per cent. Twenty of these 46 dead infants either had no fetal heart sounds or weighed four pounds or less. In 3, the weight was not stated. Twenty-



three, or 50 per cent of the dead infants, had fetal heart sounds and weighed more than four pounds (many six pounds or more) at stillbirth. We lost 27 per cent of the babies of the 85 mothers either for nothing or to save more mothers,—according to the point of view. Of 85 babies, 23 died who might have lived if they had not been subjected to delivery from below. Again I only question whether our maternal mortality justifies this.

(7) A seventh consideration is a minor one,—yet I have seen it contribute to fatal outcome. The multiparous women in whom placenta previa is most frequent are prone to vulval and vaginal varicosities. It is disconcerting to observe the difficulty of controlling bleeding from these if extensively ruptured by the head,—while a torn cervix bleeds simultaneously.

(8) Barring Germany, where very low maternal mortality is reported from bipolar version, and where, oddly enough in the face of this, there is the most enthusiasm for section in the treatment of previa, these statistics compare favorably with others or are much the same in similar institutions. To illustrate with but one example in a reasonably long series of cases; New York Lying-In Hospital, 591 cases, maternal mortality 12.1 per cent, stillbirth incidence 42 per cent. Treatment chiefly gauze packing followed by internal podalic version (R. McPherson). Kosmak reports from the same institution another series with 14 per cent maternal mortality, stillbirth rate 62 per cent.

To recapitulate these eight points before drawing conclusions:

(1) The "typical placenta previa death" with its apparent explanation by Dr. Caldwell's autopsy observations on "concealed rupture," can only be prevented surely by delivery from above.

(2) Hofmeier's recognition that placenta previa and placenta increta occur together and the danger in this, together with my own clinical opinion that some placenta previa cervixes are bound to rupture if a baby passes through. Neither of these conditions can be predicted in advance and can only be determined and appropriately treated from above.

(3) Bipolar version and Voorhees' bag induction often do not obtain full dilatation which is the desired object in conservative delivery from below; in the last inch of dilatation lies the danger of rupture.

(4) The maternal death rate is due in half the cases to rupture of the uterus, the others are nearly all due to hemorrhage and shock (so-called but practically just hemorrhage) and sepsis. It would seem that hemorrhage could be controlled as surely by delivery from above with hysterectomy if necessary, as any other way. If bleeding occurs later the uterus could be packed. We should remember in this connection that according to one theory there is no danger of bleeding from the lower segment, ordinarily (Hofmeier), and according to another, this tendency to bleed is "produced by the dilatation of the lower uterine

segment during the third stage and immediately after" (von Jaschke). In either case, therefore, we should seldom have hemorrhage in delivery from above. It would seem that sepsis is best prevented by delivery from above and hysterectomy when the history of the case makes infection probable, especially when we remember the cardinal pathology of practically all lethal sepsis—a focus of infection in the torn cervix. It would seem that ruptured uterus, open or concealed, accounts for half the deaths, and I suspect rather more can be surely prevented by delivery from above.

(5) Maternal mortality in complete previa by any method from below is so high that some other method deserves extended trial.

(6) A very high proportion of living (not too premature) babies are lost by delivery from below. Many of these would be saved by abdominal section.

(7) Ruptured varicosities sometimes contribute to a fatal result. These would not be ruptured by section.

(8) These reported results are as good as average and better than many.

#### CONCLUSION

In spite of previously held opinions, and in the face of the opinions now held by those for whose obstetrical judgment I have the most regard I am forced by this study to these beliefs:

That all central and partial previas are best treated by low abdominal cesarean section, whether the baby be viable or nonviable, living or dead.

That marginal placenta previa is best treated by Voorhees' bag induction.

That moribund or very sick patients with placenta previa should be rested, bleeding controlled by necessary methods, including tight cervical and vaginal pack and pressure over and above the fundus; transfused, operated as above on pulse and pulse pressure reaction, and retransfused. It should always be the effort to ascertain as nearly as possible how much blood has been lost and to replace that amount as nearly as possible. I think direct transfusion probably better than citrated blood if time, apparatus, and knowledge of technic permit. If there is any question of these things, the simple citrate transfusion should be used immediately, since unquestionably a quick, well-done citrate transfusion is superior to a botched direct transfusion.

Further, I believe that hysterectomy following section should be frequently practiced, each case to be considered by itself on the following grounds: risk of sepsis from previous history, persistent bleeding following the section, and number of dependent children at home. If a woman has several as is usually the case, and hysterectomy seems to improve her chances, it should unhesitatingly be done.

## INDICATIONS FOR CESAREAN SECTION\*

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IT is not the purpose of this paper to treat of those indications for cesarean section which have long been recognized by all of the profession as sufficient or absolute. The rachitic pelvis with a very short conjugate, a marked justo-minor pelvis, or, as in one of my early cases, an interschial diameter of 2.25 inches, as well as some other deformities, render the delivery of a live baby by the vaginal route an impossibility.

It is very easy in the seclusion of one's own study, to lay down hard and fast rules for this operation but when one is confronted by a specific case it is not always so easy to decide that section is, or is not, the best method of treatment even in contracted pelves where the measurements can be accurately obtained, for we still have the size of the child's head to reckon with as well as its probable compressibility. Where there is reason to suspect an unusually large fetal head the upper limit according to Williams, which is 8.5 cm. in flat and 9 cm. in generally contracted pelves, will have to be increased if one is desirous of delivering a live baby which has not been so badly hurt that it perishes after a few hours or days.

That treatment must be considered the best which results in an uninjured living child and a living mother who has sustained the minimum amount of trauma, without sacrificing her prospects for future deliveries, unless such are manifestly impossible.

In passing judgment on the treatment of a certain case one should not be too hasty to condemn a method selected without taking all the factors entering into the selection into consideration. For instance, in consultation with a physician of great experience, I elected to do a cesarean section in a brow presentation in a primipara, thirty-five years of age, at term. Potter would doubtless have delivered the baby by podalic version successfully, but I would not promise a living baby by version. The personal equation then, becomes a most important element in the case. The results in this instance justified the treatment adopted, as they doubtless would had Dr. Potter delivered by version.

When one reviews the management of a case however, as I have done, after a section had been refused, and I had been forced to extract a breech presentation in an old primipara of forty-five with a very rigid os, and when one compares a living healthy infant and a com-

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paratively uninjured mother delivered by section, with a dead baby and a badly lacerated mother with little prospects for future pregnancies lying before him, he is compelled "by the brute force of the facts" to extend his indications for cesarean section or quit the practice of obstetrics; he dares not jeopardize more lives by doing versions until he acquires the skill of the masters of that art.

Naturally no one would claim that all breech presentations in old primipara with rigid cervixes should be delivered by section, but I am convinced that there are cases in the hands of certain operators where that should be the operation of choice.

My associate, Dr. Don F. Cameron, recited a case which happened while this paper was in process of preparation which illustrates this point. He was called a distance of thirty miles to see a woman who had gone into labor twenty-eight hours previously. Her attendant found an arm and a leg protruding from the vulva together with a loop of umbilical cord. He made an attempt to deliver by podalic version but failed because he could not get his hand into the uterus on account of a contraction ring. A consultant was called in and his attempt at delivery failed because of the same Bandl's ring. Traction on the prolapsed leg also failed. When Dr. Cameron arrived the cord had ceased pulsating and another effort, under deep anesthesia, to get above the contraction ring failed. They were then simply driven to cesarean section.

In reviewing a fiasco of this kind one cannot refrain from wishing that section had been done after it was first found to be impossible to dilate the uterus sufficiently to perform version and while the cord was still pulsating. The material trauma would not have been so great and the baby would doubtless be living today. The mother recovered.

Bourne<sup>1</sup> reports two sections for contraction ring, showing that others have encountered the same condition.

In the case of high forceps operations in posterior positions of the occiput I have much the same complaint to make.

I review some of my early experiences with regret in the light of satisfactory results with cesarean section, for it certainly is not pleasant to present a mutilated dead infant to a badly damaged mother as the net result of your skill in obstetrics. It is not consoling either to reflect that there are those who could have done much better.

Here again I would not be understood as recommending cesarean section in every posterior position where there has been no engagement after twenty-four or forty-eight hours of active labor. Some men should elect version or the forceps. If there is any question as to the possibility of a living child being born through the birth canal by these means, then I should recommend cesarean section at once. The pelvic diameters may apparently be ample, but if the gestation has been prolonged and the position of the presenting head such that proper and

complete flexion cannot be secured, section should be chosen if the environment is at all suitable. However, one may have an experience such as the following: Five years ago I delivered a primipara after thirty-six hours of ineffectual labor. Her attendant assured me that it was a borderline case on account of a short conjugate and the L.O.P. We delivered by section. Two years later she delivered herself before the doctor arrived. Under these circumstances it is not only the patient who wonders whether the proper treatment was selected in the first instance.

Dr. Asa B. Davis, whose technic I adopted after hearing him describe it about fifteen years ago, writes me as follows on this point: "We also find that the size of the child varies in different pregnancies. It is quite possible for a woman to develop a very large child in one pregnancy, making cesarean section the only mode of delivering a living child. In a subsequent pregnancy her child may be smaller to the extent that she may have an easy vaginal delivery."

One may now find support for these views regarding the high forceps operation which was not possible some years past.

Essen-Möller<sup>2</sup> declines high forceps, version, or craniotomy in difficult labors if the mother is not infected. When there is undoubted infection present the Porro operation is done.

Lackie<sup>3</sup> advises section rather than high forceps in slight degrees of contraction (3.5 inches or less) because of high maternal mortality and morbidity and high fetal mortality.

There are other less frequent indications for cesarean section.

Several years ago I was asked to see a para vi in the sixth month of uterogestation. The patient presented symptoms pointing to a perforative appendicitis for which we operated, removing a gangrenous appendix and placing a large gauze drain back of the uterus. Much to our surprise she recovered without miscarrying. As the end of her period of gestation approached we were much concerned as to the proper treatment. We felt sure that there were dense adhesions between the uterus and the abdominal wall, and we were in doubt about the ability of the uterus, by its own unaided contractions, to free itself from the belly wall; if it were able to free itself we were in doubt about the amount of hemorrhage such separation would produce. If the uterus could not pull itself loose from the abdominal wall, then forceps would be needed to deliver the baby and if the uterus could not contract sufficiently after the delivery, a severe postpartum hemorrhage seemed certain. Letters to well-known obstetricians did not tend to reassure us as similar cases had not then been encountered.

We determined to open the abdomen when labor began, separate the adhesions and ligate the bleeding points, then complete the delivery through the abdomen, or close the belly and deliver through the vagina



as seemed best. Therefore, a few hours after she went into labor we opened the abdomen, and while we found many adhesions they were neither so numerous as we had anticipated nor so strong, and it is highly probable that the uterus would have been able to deliver itself without much bleeding from the torn adhesions since none of them required ligature. The cesarean section was completed because of the strain that would have been put on the stitches by the contractions of the abdominal muscles. She made a good recovery and delivered herself unaided two years later. Since that time others have had the same situation to deal with.

Strasemann<sup>4</sup> did an abdominal cesarean section for adhesions following pelvic abscess. The adhesions were very dense between the uterus and abdominal wall. The uterus was ruptured during the efforts at removal, but was finally removed, unopened. The baby was dead and very foul.

The Kelly operation is sometimes responsible for a cesarean section. It should not be done till after the childbearing period has been passed. Dougal reports a cesarean section done for this reason and another done because the labor was obstructed by a nongravid horn of a double uterus.

A previous cesarean section is sometimes an argument for a second, and by the same token it may be advanced as one of the arguments against choosing that form of delivery originally.

The dictum, "Once a cesarean always a cesarean," has been advanced in this assemblage. I do not think it holds in every case. In fact, where it is done merely because it had already been done, it seems to me to be a reflection on the surgeon. However, in a recent "borderline case" it really became the determining argument. Dr. Garrette Van Sweringen, the attending obstetrician, assured me that he could deliver with forceps even though the diameters were short and the head in a posterior position. He thought, however, that there would be less risk if another cesarean section were done. The uterine scar of the previous operation was perfect. We succeeded in getting a living baby and a comparatively uninjured mother. I was importuned to resect the tubes in this case but refused on the ground that she was as able to go through a subsequent pregnancy and test labor as she was the first and second.

As indicated above, the fact that cases of rupture of a uterine scar have been reported constitutes a contraindication for the operation, unless other considerations outweigh it.

The autumn and winter issues of the *British Journal of Obstetrics and Gynecology*, of 1921, are devoted to a discussion of cesarean section. In these issues Holland contributes an exhaustive paper on "Rupture of the Cesarean Scar," reporting five cases. He states the frequency to be 4 per cent and that the accident is due to imperfect



healing. Further, that rupture occurs almost as frequently during pregnancy as during labor. Infection is the great cause of imperfect healing. He says that catgut should not be used because the liability to rupture after catgut is two and one-half times greater than after silk.

D. S. Hillis,<sup>5</sup> of Chicago, reports four cases of "Rupture of the Uterus" admitted to Cook County Hospital from February 26, 1923, to October 10, 1923, all at the site of previous scars. They all recovered on removal of the uterus.

Most of the cases of rupture of the uterus through a previous scar have been in the lower segment. This is due to the fact, perhaps, that most operations are done low down.

Kerr uses a low transverse incision and closes with catgut for the mucous membrane and linen for the muscles. He then uses catgut to bring the bladder back to its normal position. He reports 22 cases with that technic with one fatality, one spontaneous delivery, and four repeated sections.

It is my unsupported opinion that longitudinal scars in midline of the upper pole of the uterus are less likely to rupture if the wounds are properly repaired. The mucous membrane may be brought together with catgut. There should then be two rows of interrupted linen or silk stitches to the muscular walls and the peritoneum closed by catgut. Then to prevent adhesions, a continuous Cushing stitch of catgut should be used to cover in the over and over approximating and hemostatic stitch.

Two cases are reported (*Jeff. Med. Coll. Clinic*, and *Hillis*) where rupture of the uterus occurred distant from the site of a previous scar, so that disease of the uterine musculature may conduce to rupture at any point including the site of a former operation.

Placenta previa is coming to be recognized more and more as a condition best treated by cesarean section.

Lonne<sup>6</sup> discussed a series of 200 cases of placenta previa treated by dilating bags. There were four deaths from central placenta previa treated by version and extraction. In two there was fatal hemorrhage after the uterus had been emptied and there were three deaths from septic infection. He says that in contrast with delivery by cesarean section the use of the bag is at a disadvantage.

Freund<sup>7</sup> recommends delivery by cesarean section in placenta previa centralis and the majority of those who discussed the paper before the Berlin Society endorsed his stand.

The object of this paper will have been accomplished if it shall induce those of us who engage in the practice of obstetrics to weigh carefully the advantages to both mother and child of cesarean section over many high forceps applications. Low forceps operations are frequently so simple and so satisfactory that many young physicians

hasten to apply them before engagement, or with incomplete engagement, only to find that what seemed to be a minor obstetric procedure has become a very major operation.

Also, if it shall induce surgeons to pay more attention to the closure of the uterine wounds, remembering that perfect apposition throughout is hard to secure on account of the uneven contractility of the muscular walls.

Also, if it shall help us to realize that the maternal measurements are, after all, only relative; they are to be recognized as adequate only when they will permit the passage of the fetus and this problem varies with each and every pregnancy.

In conclusion let me remind you that morphine preliminary to the anesthetic makes the work of resuscitating the infant more hazardous.

## REFERENCES

- <sup>1</sup>Bourne: Jour. Obst. and Gynec. Brit. Emp., 1921, Nos. 3 and 4.
- <sup>2</sup>Essen-Müller: Monatschr. f. Geburtsch., 1921, liv, 121.
- <sup>3</sup>Lackie: Jour. Obst. and Gynec., 1922, xxix, 377.
- <sup>4</sup>Strasemann: Zentralbl. f. Gynäk., 1922, No. 46, p. 1852.
- <sup>5</sup>Hillis, D. S.: Surg., Gynec. and Obst., July, 1924.
- <sup>6</sup>Lonne: Monatschr. f. Geburtsch. u. Gynäk., 1921, lv, 190.
- <sup>7</sup>Freund: Ztschr. f. Geburtsch. u. Gynäk., 1923, lxxxv, 581.

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(For discussion see page 256.)

## THE OCCIPUT POSTERIOR\*

BY PERCY W. TOOMBS, A.B., M.D., F.A.C.S., MEMPHIS, TENNESSEE

**A**MONG the difficulties encountered by the obstetrician there are a few more potentially disastrous than the persistent occiput posterior. Thanks to nature's versatility nearly 90 per cent of primary posterior positions rotate and deliver occiput anterior, and with these we are not concerned. Of the remaining 10 per cent, comprising the persistent posteriors and those in which anterior rotation is arrested before completion, practically all will require the aid of the attendant if a happy outcome is to be expected.

The early diagnosis of this condition is indispensable to the attendant. Each case must be individualized and, notwithstanding the high percentage of anterior rotation and spontaneous deliveries present in current statistics, it must be borne in mind that the case in question may possibly be numbered among the less fortunate 10 per cent; thus precaution should be taken to aid nature when necessary and, if possible, secure anterior rotation, flexion, and descent with as little and timely interference as possible.

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In incidence, authorities today believe primary posterior positions are much more frequent than was formerly believed, the reason being a more accurate examination revealing the true conditions present, whereas much faith was formerly placed on the position of the fetal heart tones and not enough proficiency attained in abdominal palpation and rectal touch. In many instances an accurate diagnosis is possible from abdominal palpation alone, to be confirmed later by rectal touch when the cervix has either thinned or dilated sufficiently to permit precise palpation of the cranial sutures and fontanels. The four maneuvers outlined in the modern texts on obstetrics should always be painstakingly carried out with attention to detail and repeated practice. Palpation of the fetal head at the pelvic brim, the location of the anterior shoulder and resistance of the back are of great importance, particularly the palpation of the head. The position of the fetal heart tones and soft parts, while corroborative, are conducive to an erroneous diagnosis if relied on to any great extent.

With the occiput posterior, either to the right or left as the case may be, the following points will be observed: The rounded prominence of the brow over one pubic ramus and usually nearer the midline than the occiput, thus showing a deflexion of the head, as a rule found in presentations with the occiput posterior; the anterior shoulder away from the midline and approaching the flank, with the resistance of the back well in the flank. The fetal heart will be heard probably in the same flank, though possibly in the opposite lower quadrant where the deflexion has thrown the chest against the anterior abdominal wall, thus permitting the tones to be heard with distinction and, if relied upon exclusively, suggesting a diagnosis of the opposite anterior position.

The rectal touch picture confirming the above,—and this is only possible before an extensive caput formation has obliterated the cranial landmarks,—will disclose the sagittal suture in an oblique diameter of the pelvis, converging posteriorly with the two lambdoidal sutures to form the usually obliterated posterior fontanel and anteriorly terminating in the larger more rectangular anterior fontanel with its four radial sutures.

If conditions are favorable much may be learned from the touch picture; the amount of flexion or deflexion by the height of the two fontanels, the degree of engagement by the relation of the presenting part to the ischial spines, the amount of dilatation and effacement by the cervix, the condition of the bag of waters, hardness of the fetal head, and the amount of molding taking place. If the examination is made during a pain the direction of the internal rotation, the efficiency of the bag of waters as a hydrostatic dilator, and the amount and probable course of descent may be estimated.

In reviewing the causes of primary posterior positions the usual association of a moderate pelvic contraction or at least some disproportion

tion between the fetal head and the pelvic inlet must be noted. Here, as descent occurs, the occiput instead of sinking into, impinges upon the rim of the pelvic inlet, creating a certain amount of deflexion, resulting in a military attitude or possibly a more marked condition depending upon the amount of resistance encountered. The long arm of the occipital lever is lost, and when the inclined planes of the birth canal are called upon to assist in anterior rotation their function is but imperfectly or, at most, with extreme difficulty accomplished. Thus is seen nature's handicap; not only the greater arc of the circle must be transversed by the rotating occiput, but also because of the imperfect flexion this is made doubly hard through lack of a perfect leverage. It is from such cases as these the resulting transverse arrests arise and require the aid of the attendant if a happy outcome is to be expected.

Directly opposed to the small pelvis as associated with this condition, mention must be made of the justomajor pelvis with normal size baby. The pelvis is too large, the passage and passenger do not fit, the normal mechanism of labor is not brought into play, and the inclined planes do not come in contact with the occiput as a perfect lever. In this instance flexion is not essential to the accomplishment of descent and as flexion is absent or imperfect, rotation will also be retarded as in the above indicated mechanism. Such cases are often multiparous patients with imperfect pelvic floors and surprising difficulties will often be encountered when assistance becomes necessary. Such a head is usually rotated with ease but has a tendency to regain its former position unless prevented from so doing. To my mind, here and only here is a Scanzoni rotation justifiable. These cases will often deliver spontaneously with the occiput posterior if permitted to do so, and where the pelvic floor and perineum are greatly relaxed and damaged from previous labors no further harm will be done other than a prolonged labor with the added pounding of the fetal head on the perineum.

Among the conditions predisposing to a posterior engagement of the occiput are: lax abdominal walls, the fetal back fitting the mother's flank more easily; polyhydramnios, causing the fetus to sink into one flank; peculiarities of musculature of the inlet; rigid abdominal muscles and pronounced sacral promontory; the rigid muscles forcing the fetus into one flank, the head engaging in the oblique diameter, with occiput toward the flank; the last is a frequent cause of posterior positions in young vigorous primiparous women.

The mechanism of labor in occiput posteriors is essentially the same as in anterior positions; namely, flexion, descent, rotation and restitution, except that the occiput must transverse the greater arc of the circle of rotation if it is to be born anterior.

As stated at the outset, nature is able in about 90 per cent of instances to terminate these cases without aid, despite such obstacles as the usual deflexion and the greater arc of rotation. However, prac-

tically 100 per cent of those that do not rotate spontaneously require the aid of the attendant.

Anterior rotation may be arrested at any point in the birth canal though posterior rotation does not usually occur until the occiput reaches the sacral concavity which gives rise to the occipitosacral position.

In the management of these cases, first of all, watchful expectancy is the rule, in the hope that nature will overcome the condition as so often happens. An accurate diagnosis of existing conditions is indispensable: the disproportion, if present; deflexion of the head; condition of the fetal heart; age and condition of the mother; character of the uterine contractions and their frequency; the attitude of the rotating occiput,—all of these must be kept in mind and observed frequently in order to detect the first signs of impending danger.

During the first stage postural treatment should be tried; this can only be of aid before engagement has occurred and consists in allowing the mother to rest on the side opposite that in which the fetal back is lying in the hope that the fetus will gravitate over to the other side and thus become anterior. Especially should the mother be cautioned against bearing down efforts as it is an admitted fact that these cases are particularly prone to a premature rupture of the membranes with its resultant dry labor and added insult to an already overburdened nature.

When the membranes rupture prematurely, and the fetal head fits closely the partially dilated cervix, the introduction of a bag will often bring about dilatation more quickly and, aided by synergistic analgesia, conserve the strength of the mother for the more trying second stage. It must be admitted that this is not acceptable as a routine measure, but in a well-equipped maternity hospital and in selected cases it would seem a rational procedure, though as a rule a reliance must be placed on morphine in some form to lessen the suffering of the mother without the aid of active interference, for such action is bound to lead to an increased morbidity and hence is not always justifiable without more pronounced indications.

The arrest of the head at the pelvic inlet with the occiput posterior occurs before rotation has begun and is hardly a subject to be treated in this paper, as such a condition indicates a mechanical disproportion either primary or due to a deflexion attitude, sometimes both. When due to primary disproportion without deflexion it then becomes the duty of the attendant to determine whether, after sufficient molding, the delivery from below is possible with a minimum of trauma. Such cases, regardless of the position of the occiput, should be handled with extreme care. Any arrest of the head at the inlet in a primipara early in labor should be looked upon as potentially a condition necessitating a cesarean section, which in turn demands painstaking attention to



asepsis at all times prior to and during early labor. When frank disproportion is apparent an elective section is the method of choice. However, with the late and well-deserved popularization of the low cervical section, a real test of labor may be permitted with safety, nature often surmounting apparently impossible obstacles and birth of the baby taking place spontaneously. Version in these cases should be mentioned only to be condemned.

When the arrest at the inlet is due to deflexion of the head with the occiput posterior there are several things to be considered: first, the usual incidence of contracted pelves in primary posterior positions of the occiput, indicating a relative disproportion; second, the usual deflexion present in such cases enhancing the disproportion already present. Such cases as these and the borderline cases of disproportion previously mentioned require mature obstetric judgment for their successful solution and tend to swell the already adequate category of conditions confirming the practice of obstetrics to the realm of art rather than bringing about that much to be desired state, an exact science.

Upon completion of the first stage, if molding fails to secure engagement under nitrous oxide or ethylene anesthesia, I insert my whole hand properly gloved, grasp the occiput, if to the left, with the fingers of the right hand, and vice versa, making traction, at the same time pushing up on the brow and rotating the occiput to a more favorable attitude; by pressure of the outside hand over the symphysis the head is kept in as close apposition to the pelvic brim as possible. Attempt is made to rotate the shoulders and back anteriorly at the same time. The anesthetic is then removed and under action of the next few pains the head will often engage without difficulty. We then determine whether the case should be left to nature or whether forceps should be applied and delivery accomplished with the aid of art. If it is observed that the head engages and its new position is maintained, and descent occurs with a few succeeding pains, the case had best be left to nature unless some other indication for active interference is present.

On the other hand, if after the above attempt, descent does not occur, the anesthetic should be continued, forceps applied to the head in its corrected position and traction made in hope of successful engagement. Where malposition is responsible for the arrest, either the head will engage or forceps will be successful; however, high forceps are to be looked upon only as an experiment, and should they be unsuccessful, recourse can only be had to craniotomy out of justice to the future health and well-being of the mother. I cannot, as yet, sanction cesarean section, either high or low, following attempts at delivery by nature's channels in the hope of obtaining a living child to succumb later from the previous attempted delivery; not to mention the added maternal risk, which in itself should contraindicate such procedure.

Deep arrest of the partially rotated head particularly in a primipara



would immediately suggest the possibility of an associated funnel pelvis. Such a condition should have been discovered when the pelvic measurements were taken during the antepartum examination, and if the outlet was found sufficiently contracted, a cesarean section should have been done in early labor.

On the other hand, if the outlet is sufficient and the arrest occurs according to the mechanism previously outlined in this paper, the best results will be obtained by manual rotation and delivery by forceps. These cases will usually be found with the presenting part at the spines or below, with the sagittal sutures running transversely across the mother's pelvis.

Under anesthesia, by grasping the occiput with the left hand in cases of L.O.P. and vice versa, the head may often be rotated without dislodging it from the pelvis, always making pressure on the head over the symphysis with the free hand and rotating the shoulders at the same time. If the occiput can be rotated to the opposite anterior position, that is, past the midline, backward rotation will not occur. If rotation is only effected, for instance, from an L.O.P. to an L.O.A. the head should be held in its new position by the rotating hand until the blades of forceps are in place and traction fixes it in its new position. It is now better to effect delivery at once as maternal and fetal distress are usually present.

Particularly does it exert a bad depressing influence on the mother if after laboring so long she is put to sleep in the hope of obtaining relief and on awakening finds that she must continue her battle. Such action, as a rule, only necessitates a later forceps delivery and nothing is gained by such delay.

In the manual rotation and application of forceps to these cases it is better not to dislodge the head if possible. Correctly applied pressure by the inside hand is a great aid in this maneuver. It sometimes happens, however, that rotation cannot be performed satisfactorily; then it becomes necessary to dislodge the head in order to rotate it to a new position. The great danger here is the possibility of a prolapsed cord; such a catastrophe indicates an immediate version and extraction if manual reposition cannot be accomplished.

Having rotated and flexed the head into an anterior position, forceps are applied to the sides of the child's head and traction will effect delivery. In applying forceps, if the under, or stationary blade, be applied first, i.e., in O.D.A., the right blade, and vice versa, and held by an assistant, the wandering blade may then be applied without disturbing the head from its new position. In primiparous patients episiotomies should be performed routinely, and in multiparas the dilatation of the perineum with tincture of green soap is very efficacious.

A final survey of posterior positions brings to light a condition the presence of which should be the duty of every obstetrician to guard

against; namely, the neglected occipitosacral. From the standpoint of fetal mortality this is a truly disastrous condition. With a history of long suffering, maternal and fetal exhaustion are evident, the examining hand discloses the fetal head firmly driven into the pelvis and all cranial landmarks obliterated by a large caput. The location of the ear is the only means of determining accurately the position of the head. The membranes, as a rule, will have been ruptured for hours, the uterus clamped vise-like upon the child's body with a possible localized contraction ring and thinning of the lower uterine segment to the point of danger. Regardless of what is done the probability of delivering a stillborn fetus is very likely. Manual rotation is next to impossible without a very deep anesthesia; however, it should be tried in the hope of saving the mother extensive laceration. If this fails and the child is still viable, forceps should be applied under deep anesthesia; and with an episiotomy extending into the levator muscle, delivery should be effected. The alternative here, where fetal life is at a low ebb from the repeated pounding against the perineum and possibly irreparably damaged from repeated attempts at delivery, necessitates in the interest of humanity and tenacity to sound obstetric judgment that gruesome and much to be deplored operation, a craniotomy.

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(For discussion see page 256.)

## THE RELATION OF THE PHYSIOLOGY AND MECHANICS TO THE MANAGEMENT OF LABOR\*

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THE selection of this subject seems justified by the widespread and apparently increasing disregard of physiologic and mechanical facts and the violation of established principles in the practice of obstetrics. There is too often the tendency to ignore the marvelous adaptability of the natural process of labor to the purpose of reproduction. It is my firm belief that this tendency is responsible in a large measure for the unsatisfactory results of obstetric practice in this country.

In the first stage of labor the process is one merely of alternate contraction and relaxation of the uterus. Natural labor pains will very rarely last longer than a minute and a half and there is a sufficient interval between pains to permit the refilling of the sinuses and proper oxygenation of the fetal blood. While the contractions occur with considerable force, the bag of waters and the presenting part press evenly outward, accomplishing dilatation of the cervix with the utmost gentle-

\*Read at the Thirty-eighth Annual Meeting of the American Association of Obstetricians, Gynecologists, and Abdominal Surgeons held at Hot Springs, Va., September 16, 17, 18, 1925.

ness. The fascial and ligamentous supports of the uterus are uninjured. There is little shock or exhaustion, provided the patient is given the necessary rest and food.

In the second stage the force of the bearing down efforts of the patient is added to the force of the uterine contractions. The resistance of the pelvic bony and soft structures is offered to the fetal head. There is gradual gentle stretching of the soft parts and molding of the head. It is a period of greater danger to both patients, requiring closer supervision. If the forces are not naturally so, they can usually be directed within the limits of safety. In the third stage, the alternate contraction and relaxation of the uterus is ideally favorable to the detachment and expulsion of the placenta without serious loss of blood.

The fetal head acts mechanically as a wedge in labor,—a blunt oval and poor dilator at the tip but quite effective near its largest part. This accounts for the more intense suffering of the mother, the frequent bloody discharge from the usually slight and unimportant tears of the cervix, and the slowing of the fetal heart tones as the largest part of the head passes through the cervix. If the head is forced downward before complete dilatation of the cervix or if the rectum and bladder are distended, the advancing head may drag upon and injure their supports. The structures below the level of the levator muscles retard the head, permitting the more gradual dilatation and less frequent tears of the levator muscles and their fascial sheath, so important in pelvic support. As the large part of the head reaches the less important structures below, tears are frequent unless the head is retarded and time given these structures to stretch.

The bones of the skull, the unruptured bag of waters in the first stage of labor, and the two sheaths of fascia within the skull, the falx cerebri and the tentorium cerebelli, tend to prevent excessive molding of the head which may cause serious damage to the brain. Besides these functions these dural sheaths convey most of the large intracranial sinuses and, as elucidated by Crothers,<sup>1</sup> also play an important part in the control of intracranial pressure. The tentorium which forms the roof of the cerebellum and is supported by the falx attachment, protects the vital areas below from much of the pressure incident to compression of the cranial vault. Tears may permit the collapse of the tentorial roof, in which case the supratentorial pressure will be brought to bear in a larger measure upon the cerebellum, and the medulla may be pressed against the anterior lip of the foramen magnum.

The occipitoanterior position with good flexion is ideally suited for the safe outcome of labor. It permits the maximum utilization of time, a very important factor in the adaptation of plastic and elastic structures. It presents the smallest plane of the fetal skull, the suboccipitobregmatic, making necessary the minimum adjustment between the fetal head and maternal structures. Molding, being toward the firmer

posterior portion of the cranial vault to which is attached both the falx and tentorium, is least likely to be too sudden or excessive. The wider anterior fontanel and sutures leading into it permit the depression of the anterior part of the cranial vault incident to molding in this position with less danger from overlapping of the bones. Pressure upon the buttocks by the contracting uterus tends to maintain complete flexion and, since the spinal column is about two inches shorter when compressed than when extended, there is a diminution in the sub-tentorial space with a corresponding increase in subtentorial pressure.<sup>1</sup> This tends to equalize somewhat the supratentorial and subtentorial pressure and lessens the danger of tentorial tears. In cases of occipito-posterior position and the various degrees of deflexion the larger plane of the skull which engages, necessitates a greater degree of accommodation between the head and the maternal soft parts, the molding of the head is in a less favorable direction, and the oval shape of the presenting plane predisposes to irregular and ineffectual uterine contractions and early rupture of the bag of waters.

In foot-first deliveries there is the necessity for a rapid adaption between the fetal head and the birth canal which is prone to result in more injuries to both. The subtentorial is diminished as compared to the supratentorial pressure, resulting in a downward pressure upon the tentorial roof. At the same time the vertical bulging of the head pulls upward on the tentorial attachment of the falx. This mechanism is decidedly conducive to tentorial tears. Traction on the feet and suprapubic pressure on the head exaggerate this condition. Maintenance of complete flexion is difficult. Any degree of traction on the feet is conducive to extension of the head with all the disadvantages of that mechanism. The danger of injury to the spinal cord and of fracture of the vertebrae is also a real one. Potter has made a valuable contribution to the technic of version in emphasizing the great importance of endeavoring to overcome the resistance of the soft parts before performing version and of exercising extreme deliberation and gentleness in the management of the after-coming head.

In premature babies the softness of the bones of the skull and the greater friability of the soft structures result in more frequent birth injuries, notwithstanding the easier labors in these cases.

Tears of the septa or hemorrhage, or both, may be found in at least half of the stillborn and dead newborn babies if proper search is made. Holland<sup>2</sup> found tentorial tears in 81 of 167 cases. Of these 35, or 43 per cent, were delivered feet first and 25 of the 46 vertex cases were forceps deliveries. He found tentorial tears in 88 per cent of dead fetuses after normal breech deliveries. Cruickshank<sup>3</sup> found that 47 per cent of mature cases and 52 per cent of premature cases with tentorial tears, were delivered feet first. Divide these percentages by 5, the average percentage of foot-first deliveries, and these statistics indi-

cate that tentorial tears are eight to ten times as likely to occur in foot first as in vertex cases. Saenger,<sup>4</sup> in autopsies on 100 newborn babies, found that of 23 children delivered feet first, only 3 failed to show tentorial tears and only 1 failed to show hemorrhage. Of 46 cases of hemorrhage, 22, or 48 per cent, were among the 23 babies delivered feet first. Browne,<sup>5</sup> from a study of 400 autopsies, concludes "that breech delivery is ten times as likely to give rise to cerebral hemorrhage as delivery by the vertex," and "that cerebral hemorrhage is seven times as likely to occur in premature infants as in infants at term." Pierson<sup>6</sup> reports 142 viable primary breech deliveries with 18 fetal deaths (12 per cent) and 87 viable version and breech deliveries with 18 fetal deaths (26 per cent). Eliminating the cases with no autopsy, those in which the condition of the spinal cord was not noted and the craniotomies, there were 22 of the 36 cases with complete autopsy data. Of 12 primary breech cases, 7 had fractured vertebrae in one of which the cord was severed. Of 10 version and breech cases, 7 had fractured vertebrae, 1 with complete and 2 with partial severance of the cord. In only 2 of the 22 cases, one in each group, were the brain and spinal cord normal. It should be remembered that these statistics are taken from some of the foremost obstetric clinics of the world where the quality of the service may reasonably be supposed to be of a high order.

The life of the fetus depends not upon the cerebrum and cerebellum, but upon the vital centers in the medulla and upper cord segment. The dangers to these centers during labor are from asphyxia and trauma. They may be rendered inexcitable by pressure against the anterior lip of the foramen magnum or by so slight an accident as the leakage of blood in this region. They are indicated clinically by a marked slowing of the fetal heart rate.

On the other hand the vital centers succumb to asphyxia much less readily than was indicated by the old teaching that death from asphyxia would follow unless the head were born within six or eight minutes after the umbilicus in breech deliveries. Experiments indicate that the cells of the medulla can resist total anoxemia for twenty minutes. Asphyxia is, nevertheless, one of the chief dangers to the baby during labor. Frequent prolonged contractions of the uterus and increased tonicities of the uterus between pains, detachment of the placenta from whatever cause, and drugs given to the mother may cause asphyxia in the baby. Except when due to drugs that also depress the respiratory center, the early effect of asphyxia is stimulation of the center of respiration resulting in inspiratory efforts of the fetus. In the first stage of labor this results in the insufflation of liquor amnii into the fetal lungs. The amniotic fluid is usually sterile as long as the membranes remain intact. Since the cervix is infected in about 50 per cent of women and the amniotic fluid is a good culture medium, the latter



becomes infected in a large percentage of cases soon after rupture of the membranes. Insufflation of infected amniotic fluid or cervical mucus may cause pneumonia, a frequent cause of neonatal death and sometimes a cause of death even before birth.<sup>7</sup> In the late stages of asphyxia there is depression and finally paralysis of the center of respiration and a tendency toward hemorrhages in various parts of the body. Asphyxia is indicated clinically by slowing of the fetal heart tones, and sometimes by visible inspiratory movements.

The tragic consequences of lesions of the cerebrum and cerebellum are manifested by the morbidity that follows damage to the sensory-motor tracts.

In the light of the physiology and mechanics involved the general principles to be followed in the management of labor would seem obvious. In addition to asepsis, these are: In the first stage, the correction, if possible, of any unfavorable presentation or position of the fetus; providing the patient with the needed amount of rest and food; proper attention to the bladder and bowels; watchfulness as to the condition of both patients including observation of the fetal heart tones, and the temperature, pulse, and respiration of the mother.

In the second stage the same general management should prevail, plus closer observation of both patients and the control of the bearing down efforts and the advancement of the head within the limits of safety. If the fetal heart tones remain below 100 between pains, this should be taken as a sign of grave danger to the baby. If the pains are frequent and severe with little intermission, the patient should be instructed to refrain from bearing down and the suggestion of Frey,<sup>8</sup> that she be given an anesthetic for a short time to diminish the severity of the pains, would seem logical. Should the fetal heart tones still remain slow, delivery should not be delayed. In premature delivery, the resistance of the perineum should be overcome by dilatation or incision.

In the third stage, until the placenta becomes detached, when it may be easily expressed, the same policy of noninterference with the natural process should be followed, except in cases of hemorrhage. Departure from these principles long established in obstetric teachings, should be undertaken only for real and proved reasons.

The use of bearing down efforts in the first stage is perhaps, at the same time, the most widespread and most senseless form of interference with the course of labor. I know of no one who would defend the practice. Certainly, it has no logical defense. Among the immediate effects are the stretching and tearing of the supports of the uterus, rectum and bladder; hemorrhage from elongation of the anterior lip of the cervix or from laceration, and exhaustion of the patient. The frequent later effects are prolapse and retroversion of the uterus, cystocele, rectocele, lacerations of the cervix and cervicitis, with the definite



morbidity of these conditions often unrelieved by operation. The practice is altogether pernicious in the first stage—and that means until the cervix has passed entirely over the presenting part and beyond the reach of the examining finger.

Pituitary extract under various names, is still used by many men in practically every case where time will permit its administration. It is given to increase the frequency, duration, and severity of the uterine contractions, which it does, frequently in a lawless manner. It also increases the tonicities of the uterus between pains. In 1916 Mundell collected and reported 1293 cases of its use, with ruptured uteri in nearly 1 per cent of cases, and fetal death attributed to the drug or asphyxia in 7 per cent of cases. Its administration before the birth of the child should be limited to cases of uterine inertia in the second stage of labor with unobstructed delivery,—a very rare combination.

Manual dilatation of the cervix is another procedure too often undertaken for insufficient reasons. The frequently used term, "dilatable cervix," is a pitfall for obstetric disaster. I know of no condition in which the cervix cannot be either dilated or torn, nor of any condition in which manual dilatation can be accomplished without great danger of laceration. My own experience is in thorough accord with Polak's statement that the manually dilated cervix is a manually torn cervix in nearly every case. This procedure should be undertaken for only such indications as justify the definite hazard of a damaged cervix. Like other obstetric procedures, it is frequently undertaken on account of exhaustion of the mother, a condition often more imaginary than real, but the logical treatment of which, if present, would seem to be rest rather than an operation which may cause profound shock.

Routine delivery by version and forceps has been championed by Potter and DeLee respectively. I am sure that their genius and operative dexterity enable them to minimize the dangers of these procedures. I do not believe, however, that it has been established that they are safer, even in the skilled hands of these men than less radical procedures. In the hands of the average man, their more frequent employment is making a substantial contribution to the mortality of obstetrics,—just about neutralizing the real benefits of better prenatal care.

The emphasis which has been placed in recent years upon what has been called the "pathogenicity of parturition" has had as its natural effect, the tendency to substitute artificial for natural delivery, by extending indications for various operations, or by so perfecting the technic of a particular operation as to justify its routine employment. Proper management in labor is not unlike proper practice in any other field of medicine in these respects. Supposed wizardry in the execution of any particular procedure does not constitute a panacea for all troubles; it is rather the logical dealing with whatever condition may be present, predicated upon the ability to diagnose, plus a full knowl-

edge of the physiology, mechanics, and pathology with which we have to deal. If we feel inclined to operate more often, we should be sobered by the fact that in England, where two-thirds of the deliveries are by midwives, who by law are not permitted to operate, the reported maternal mortality according to Fairbairn<sup>9</sup> is less than half that in the registration area of the United States. When interference is indicated, there should be as little departure from the physiologic as possible, both in the application and in the amount of force employed. The biologic reason for conservatism lies in the fact that both the maternal and fetal organisms have become accustomed to natural labor by ages of experience and will, as a general rule, suffer less harm from such a labor than from an operative delivery, however skillfully performed.

## REFERENCES

- <sup>1</sup>Crothers, B.: Surg., Gynec. and Obst., 1923, xxxvii, 790.
- <sup>2</sup>Holland, E.: Jour. Obst. and Gynec. Brit. Emp., 1922, xxix, 531.
- <sup>3</sup>Cruikshank: Ref. AM. JOUR. OBST. AND GYNEC., January, 1925, p. 141.
- <sup>4</sup>Saenger: Ref. AM. JOUR. OBST. AND GYNEC., January, 1925, p. 141.
- <sup>5</sup>Browne, Francis J.: Edinburgh Med. Jour., September, 1924, pp. 158-203.
- <sup>6</sup>Pierson, R. N.: Surg., Gynec. and Obst., 1923, xxxvii, 802.
- <sup>7</sup>Johnson, W. C., and Meyer, J. R.: Am. Jour. Obst. and Gynec., 1925, ix, 151.
- <sup>8</sup>Frey, Reference by Ehrenfest, Zentralbl. f. Gynäk., 1924, xlviii, 947.
- <sup>9</sup>Fairbairn, J. S.: Jour. Obst. and Gynec. Brit. Emp., 1925, p. 139.
- <sup>10</sup>Ehrenfest, Hugo: Birth Injuries of the Child, New York, 1922, D. Appleton Co.
- <sup>11</sup>Idem—Gynecological and Obstetrical Monographs, Appendix, New York, D. Appleton Co., 1925.

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(For discussion, see page 256.)

PREPARATION OF THE EXTERNAL GENITALIA FOR  
DELIVERY WITH IODINE-ALCOHOL: REPORT OF  
100 CASES SO TREATED, WITH BACTERIOLOGIC  
RESULTS\*

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WE read frequently that the mortality from puerperal sepsis is not decreasing in the United States and that it has remained practically the same between 1904 and 1920. This ought not to be. There must be a number of reasons why puerperal sepsis, a germ disease, a preventable disease, has remained with a high mortality, while the other germ diseases are rapidly vanishing from the earth.

We learned as far back as 1843 from Holmes, Semmelweis, and others, to wash our hands before, rather than after, delivering a woman: years later, we learned from Pasteur and Lister why we should do this. Later still, we learned to keep our hands out of the vagina as much as possible, during and shortly before labor, and that every vaginal examination, over one, greatly increases the risk of sepsis. We know that we must work through a surgically clean field. The simpler and easier it can be made to obtain such a surgically clean field, the more readily it will be followed by the men in general practice, who, from the difficulties under which they practice, must have at their disposal, a simple technic. Most of the obstetrics throughout the country is still done by the men in general practice, and it lies in their power to appreciably cut down the incidence of puerperal morbidity and mortality. That surgically clean surroundings can be had in the most humble circumstances, is proved by the excellent results now being obtained in the out-patient departments of the large maternity hospitals of many of our great cities. It seems settled that we must combine antisepsis with asepsis if we would succeed in effecting a clean delivery, and this paper will deal very briefly with the one detail of the preparation of the external genitalia, since we know that working through a dirty field is one of the conditions that must obtain in keeping up the high incidence of puerperal morbidity.

After hearing Dr. Titus' paper at Cleveland last year, it occurred to me that it might be worth while to prepare a number of cases with iodine-alcohol, and to note the results bacteriologically, as well as the morbidity. I had done this several years ago, with encouraging results, but only in some 29 cases. Since last year I have added 100 cases, each of them prepared and delivered by me. I am aware that 100 cases are not enough upon which to base accurate conclusions, but the study of 100 cases will show "which way the wind blows" and may stimulate

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others with larger opportunities to confirm or contradict the observations here offered.

The plan followed has been this: Nothing is done for the patient except a cleansing enema and a close clipping of the pubic and labial hair; none have been shaved. After putting on a sterile gown and shortly before the woman is expected to deliver (some fifteen or twenty minutes) two coats of 3.5 per cent tincture of iodine (which is one-half the strength of the ordinary pharmacopeial tincture) are painted over the external genitalia, the inner sides of the thighs, in fact over all of the skin area that will not be covered by the sterile drapery. (Right here it may be remarked that a woman can be accurately draped for delivery with only four towels, one across the abdomen, one around each thigh and one under the buttocks. While this is not all that may be desired, it is enough to show that it is not intricate or difficult to obtain clean drapery, but simply requires a little forethought.) As soon as the iodine dries, it is removed or partially neutralized by the copious application of alcohol, for which purpose any of the ordinary alcohols will do. Shortly after the use of the alcohol, smears were taken from the greater and lesser labia, and from the skin area near the vulva: none were taken from directly over the anus, though that area was included in the preparation. None were taken from the vagina, further than the introitus, as the iodine did not extend further than that. These swabs were then implanted on fresh slants of Cornell media and incubated for forty-eight hours before being read. The results were as follows: 9 positive cultures, the staphylococcus being found seven times, colon-staphylococcus combined, one, and colon one. However, not one of these positive cases ran a febrile temperature, and only three of the hundred had a febrile temperature. By febrile, or morbid, temperature is meant any case that showed a temperature as high as  $100.2^{\circ}$  and lasting for twenty-four hours: or any that reached as high as  $100.2^{\circ}$  at any time during twenty-four hours for two consecutive days. Of the three febrile cases, one had a pyelitis, the patient entering the hospital with a temperature of  $100^{\circ}$ , and running a low grade pyelitis temperature for three weeks after labor. The second case had a temperature of  $100.2^{\circ}$  on the second day postpartum,  $101^{\circ}$  on third day,  $103^{\circ}$  on fourth day, reaching (and remaining) normal on the fifth day. The third febrile case had  $100.2^{\circ}$  on the second day, to  $101^{\circ}$  on the fifth day, thereafter reaching normal. The corrected morbidity therefore is 2 per cent. Both had negative blood cultures.

A further analysis of the 100 cases showed 45 primiparae, and 55 multiparae: 33 had one rectal examination, 27 had two, 15 had three, 7 had four, 2 had five, 3 had six, and 2 had seven. Thirty-eight had one vaginal examination, in addition to any rectal they may have had, 7 had two vaginal examinations, and 1 had three. The forceps was used 38 times. This would account for the rather large number of vaginal examinations, as most of the cases having one vaginal examina-

tion were forceps cases, the examination being made either at the time of application or very shortly before. Laceration of various degrees, occurred in 72 cases: certainly not a record to be proud of, but one to cause humility, and having only the virtue of honesty of report to commend it! There were 8 breech presentations, 2 versions, 2 bags, and 1 pack (induction labor). Of the three febrile cases, the patient with pyelitis had no vaginal examination and delivered herself spontaneously. One of the other febrile patients had three vaginal examinations, five rectal, was delivered by forceps and had seven sutures inserted; the other febrile patient had one vaginal and four rectal examinations, was delivered by forceps, and had nine sutures inserted.

To compare with this group of 100 cases, 100 others were analyzed that had been prepared by shaving and scrubbing with soap and water, and final use of bichloride or lysol. This latter group was delivered in the same hospital, during the same period, by a number of attending physicians, the hospital being an open one. Primiparae 55, multiparae 45; 38 had one vaginal examination, 9 had two, 8 had three, 2 had five, 17 had one rectal, and 5 had two rectals. The forceps were used fifteen times, 43 were noted as lacerated, and 14 ran febrile temperatures. Thus, though the forceps was used only one-third as often, though there were just a fraction over half as many lacerated, yet the incidence of morbidity was five times as great! (There were no deaths in either series.)

Since the above analysis was made, Dr. James Mayes, of Brooklyn, has reported a very much larger series of cases prepared with 4 per cent solution of mercurochrome, used both externally and within the vagina, and with a corrected morbidity of 3.26 per cent (460 cases). This is a very successful result and deserves careful consideration. It is a question still in my mind as to whether we should invade the vagina as a routine, with *any* kind of an antiseptic; also, as far as I am able to learn, mercurochrome has no advantage over tincture of iodine as a penetrating, effective skin antiseptic. It is quite true that mercurochrome is not irritating and iodine is. The patient should be at least *partly* under an anesthetic when the iodine is applied, so that if pain be complained of, a few inhalations will relieve her. I have never seen blistering of the skin occur and attribute this to the care with which it is applied, and to the early neutralization with alcohol.

One may therefore conclude that we have in either the iodine-alcohol, or the 4 per cent mercurochrome method of preparation of the genitalia for delivery, a procedure that is safer than any yet advanced; each is simple and can be used by any one who will take the trouble to have the solutions prepared shortly before expected delivery. The iodine-alcohol would seem to be the simpler of the two, as it can be used with effect as late as five minutes before delivery, whereas, the use of mercurochrome is advised at least one hour before any operative procedure.



## OBSERVATIONS ON THE TREATMENT OF THE EDEMA OF THE TOXEMIA OF PREGNANCY WITH AMMONIUM CHLORIDE\*

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**E**DEMA of varying degree is almost always evident in cases of pre-eclamptic toxemia, regardless of whether the toxemia is of the so-called true eclamptic or of the nephritic type. There is also a definite increase in weight, and usually a rise in blood pressure. In fact, a rapid gain in weight may be an early sign of toxemia.<sup>1</sup> The urine is decreased and contains albumin. A slight pitting of the ankles is usually accepted as normal in cases of pregnancy, but the pitting becomes pathologic when marked or when it appears elsewhere on the body.<sup>6</sup> Wieloch describes an insidious edema in which an excess collection of fluid in the tissues occurs before the pitting of edema is noticeable.

The term "preeclamptic toxemia," as commonly used, covers toxemia in which pathologic changes in the liver predominate, as well as the acute nephritis and acute nephrosis of pregnancy. Edema may occur as the result of preexisting nephritis. Such cases will be discussed in this paper, rather than those of edema due to cardiac decompensation or venous pressure in the pelvis. The pathologic cause of edema will not be discussed.

The edema of preeclamptic toxemia when marked and accompanied by hypertension and albumin in the urine is indicative of a grave condition. Headaches, dizziness, and finally eclamptic convulsions may occur, and the question of whether they are due directly to a toxin or to edema of the brain accompanying the toxic condition, may be disputed. It is a fact, however, that relief from the edema is accompanied by improvement of symptoms.

Similar clinical features obtain in cases of acute glomerulonephritis, a resemblance further strengthened by similar findings in the chemical examination of the blood, which is practically normal in both, aside from an increase in the retention of sodium chloride. The nonprotein nitrogen of the blood rarely shows any increase. On the other hand, the edema of chronic nephritis is usually associated with an increase of nonprotein nitrogen in the blood and frequently with the retinal changes accompanying chronic renal disease.

Improvement accompanying the reduction of edema has been noted by the internist in cases of acute nephritis and acute nephrosis, and by

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the obstetrician in cases of the toxemia accompanying the edema of pregnancy. Relief from edema is secured by the removal of the excess fluid from the body, chiefly by increasing the urinary output.

Diuresis may spontaneously follow rest in bed, especially if the patient is on a diet low in water, salt, and protein. It may occur after venesection in the presence of marked hypertension, and is often associated with removal of toxic material from the bowel by catharsis or flushing the colon. Various drugs have been used for their diuretic effect.

Meyer and Cohn, in 1911, added a certain amount of calcium chloride to the food of infants and found that, owing to loss of water, their weight was decreased. Schultz, in 1918, gave 10 gm. of calcium chloride daily to patients with war nephritis, and in several cases noted prompt diuresis and loss of edema. Keith, Barrier, and Whelan have confirmed the work of others along this line, and have demonstrated the value of the use of calcium and ammonium chloride, and more recently ammonium chloride and novasurol in the production of diuresis in cases of nephritis with edema. They showed that following the daily ingestion of 10 gm. of calcium chloride or ammonium chloride, the urinary output was markedly increased. Coincident with the diuresis and lessened edema, there was increased excretion of sodium, mostly as sodium chloride. They assert that large doses of ammonium chloride cause acidosis and an increase of blood urea, and that great care should be taken in its use if the urea retention in the blood is considerable.

Ulrich reports the use of novasurol in a case of eclampsia with convulsions, marked edema, and anuria. The drug was used after other measures had failed to effect improvement and the patient's subsequent recovery was ascribed to the diuresis produced by the drug.

Last year findings in a group of patients with toxemia of pregnancy, whose clinical symptoms resembled those of acute glomerulonephritis, were reported.<sup>5</sup> Following Keith's suggestion, I first used calcium chloride, and later ammonium chloride for their diuretic effect in a small group of similar cases. Calcium chloride was discarded because it is particularly distasteful, frequently causing nausea and vomiting. Ammonium chloride was given in tablet form until gelatin-coated capsules containing 1.5 gm. were obtainable. The drug was tolerated much better in the latter form, although in two cases its use had to be discontinued on account of vomiting. Its use, however, was generally followed by prompt diuresis, disappearance of edema, marked loss of weight, lowered blood pressure, and general improvement of the patient. In most cases the improvement was greater and more lasting than that obtained by dietary and other measures.

The patients under observation were kept at rest in bed. The daily diet was limited to 1500 calories containing 50 gm. of protein, with a minimum of salt, and 800 c.c. of fluid. In most instances before medi-



cation was started, the urinary output was observed for several days and the blood was examined for its urea content and alkali reserve. Up to 10 gm. of ammonium chloride were given by mouth daily, even after diuresis was effected, and if possible, until the edema disappeared. Usually a total of from 50 to 100 gm. of ammonium chloride was given. Following the disappearance of edema, the fluid intake was increased.

## REPORT OF CASES

CASE 1.—The patient showed evidence of toxemia at the fourth month. She ignored instructions, returning at the sixth month with albumin 3, systolic blood pressure 186, and diastolic 128, edema 3, and weight 215 pounds (normal, 175 pounds). She remained in the hospital approximately twenty-five days. Her weight dropped 32 pounds, 19 pounds in the first nine days before the medication was started, and the systolic blood pressure fell to 158 and the diastolic to 102, with albumin 1. She left the hospital against the advice of physicians, and ten days later gave birth to a still fetus. Calcium chloride was used for two periods, the first for five days and the second for six days. Although a slight diuresis was produced, the benefit may be questioned. The patient has not since been observed, but a tentative diagnosis of chronic nephritis was made.

CASE 2.—Ammonium chloride was started on the fourth day, and a total of 60 gm. were given. The average daily output of urine before its use was 400 c.c., and during its use 915 c.c. The patient lost 5 pounds in three days prior to the treatment, 17.5 pounds during the seven days of treatment, and 1.5 pounds in three days after the treatment was discontinued. Three weeks after the patient's dismissal from the hospital, her blood pressure had risen to 150 systolic and 90 diastolic, with no edema, and there was albumin 3 in the urine. A living babe was delivered by cesarean section; three had been done previously for contracted pelvis. The patient recovered uneventfully.

CASE 3.—The patient was sent to the hospital in the thirty-seventh week of gestation on account of a sudden increase of the systolic blood pressure from 120 to 140, and the appearance of edema 2. Ammonium chloride was started on the second day and 28 gm. were given in five days. The loss of 9 pounds in six days and the slightly increased output of urine were no doubt partly the result of the medication. Labor was induced by castor oil and quinine at term, and a living babe was delivered.

CASE 4.—Calcium chloride was given at first but could not be retained. Ammonium chloride was started on the fifth day, continued for eight days, and during its use, the urinary output increased from an average of 350 c.c. to 1,250 c.c. daily, and the patient lost 20 pounds. She was dismissed from the hospital on the thirteenth day. Six days later she went into labor spontaneously and was delivered of a living babe. At this time she had no edema; her systolic blood pressure was 160 and diastolic 100 during labor, and the following day the systolic blood pressure was 118 and the diastolic 85.

CASE 5.—The patient had a rather abrupt onset of toxemia. Her normal weight was 140 pounds. At the thirty-second week of gestation her weight was 179 pounds with no albumin in the urine. Four weeks later she weighed 190 pounds, had edema 2 and albumin 2. She had an initial diuresis and loss of weight following the use of ammonium chloride. This had to be discontinued on account of vomiting after eight days when 34 gm. had been given. She had lost 15 pounds up to this time, but subsequently did not lose. Labor was induced on

the seventeenth day because of a sudden rise in blood pressure accompanied by severe headache.

CASE 6.—Ammonium chloride was started the day of admission and 54 gm. were given in six days. The average daily urinary output was 1,020 c.c., as compared to an average of 450 c.c. after the medication was discontinued. Loss of weight and disappearance of edema was followed by only a moderate fall in blood pressure which persisted around 170 systolic and 110 diastolic. On account of this and the onset of headaches five days later, labor was induced and a living child was delivered.

CASE 7.—The patient had subacute nephritis without marked edema. After she had been observed for a week, she was given ammonium chloride for two periods. In the first period, during which 46 gm. were given in six days, her weight decreased 10 pounds and the edema disappeared. After an interval of eight days on the same general treatment and without medication, she gained 10 pounds and the edema reappeared. Following another course of medication, during which 40 gm. were given in four days, the edema again disappeared. The blood pressure remained high, systolic 166, and diastolic 104; there was albumin 2 in the urine. During the following week the fetus died and labor was induced a week after the cessation of medication; the patient recovered slowly with a slightly increased blood pressure, systolic 132, and diastolic 86. This and a faint trace of albumin in the urine were the only indications of renal damage. Ammonium chloride had a definite diuretic effect in this case and seemed to ward off more severe trouble.

CASE 8.—The patient went into labor spontaneously six days after admission to the hospital. Previous to that time, her weight had remained at 175 pounds with an average daily urinary output of 350 c.c., and edema 3. The second day after confinement the weight was 165 pounds, with edema 2 and albumin 2; the systolic blood pressure was 182, and the diastolic 118; the day before labor it had been 176 and 120. In the next eleven days, 110 gm. of ammonium chloride were given with an average daily urinary output of 1,900 c.c.; the weight dropped to 116 pounds (a loss of 49 pounds); the edema disappeared, and albumin 1 was found in the urine. On the day after the patient's admission to the hospital, the blood urea was 71 mg. for each 100 c.c. of blood, and five days after the medication was started, the blood urea was 16 mg. for each 100 c.c. of blood. Her subsequent convalescence was uneventful, although she has a slight residual chronic nephritis.

#### SUMMARY AND CONCLUSIONS

The excessive increase in weight in cases of toxemia of pregnancy is usually due to retention of fluid in the tissues, which may not always be recognized as edema. The use of ammonium chloride in conjunction with rest in bed, restriction of diet and fluid intake usually causes an increased excretion of urine. The results obtained in this series of cases justify the continued use of ammonium chloride as a diuretic in similar cases. The increased excretion of urine and loss of edema with resulting loss of weight, probably carries from the tissues sufficient toxin to improve the condition of the patient. In several instances, the improvement was lasting, apparently enabling some of the patients to carry on until a living child could be delivered. The convalescence of the postpartum patient (Case 8) was unquestionably shortened, and probably more severe residual nephritis was averted.

The resemblance between the action of ammonium chloride in certain cases of eclamptic toxemia and cases of acute glomerulonephritis is rather striking. Although there is usually little or no increased retention of urea in the blood, ammonium chloride should not be used without examinations of the blood for urea and alkali reserve, as manifested in the carbon dioxide combining power.

## REFERENCES

- <sup>1</sup>Davis, C. H.: Jour. Am. Med. Assn., 1923, lxxx, 249.  
<sup>2</sup>Keith, N. M., Barrier, C. W., and Whelan, Mary: Jour. Am. Med. Assn., 1924, lxxxiii, 666-670.  
<sup>3</sup>Keith, N. M., Barrier, C. W., and Whelan, Mary: Jour. Am. Med. Assn., 1925, lxxxv, 799-806.  
<sup>4</sup>Meyer, L. F., and Cohn, S.: Ztschr. f. Kinderh., 1911, ii, 360-419.  
<sup>5</sup>Mussey, R. D.: AM. JOUR. OBST. AND GYNEC., 1925, ix, 808-819.  
<sup>6</sup>Randall, L. M.: AM. JOUR. OBST. AND GYNEC., 1925, ix, 529-535.  
<sup>7</sup>Schultz, Erich: Ztschr. f. klin. Med., 1918, lxxxvi, 111-138.  
<sup>8</sup>Ulrich: Deutsch. med. Wehnschr., 1923, ii, 885-886.  
<sup>9</sup>Wieloch, J.: Zentralbl. f. Gynaek., 1924, xlviii, 898-902.

(For discussion see page 262.)

THE INTRAMUSCULAR INJECTION OF MAGNESIUM  
SULPHATE FOR THE CONTROL OF CON-  
VULSIONS IN ECLAMPSIA\*

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MAGNESIUM sulphate was first used in experimental work for the control of convulsions by Meltzer, in 1899, and later, together with Auer, further experiments were made upon monkeys infected with tetanus, and these were published in 1905. Kohn and Straube confirmed the findings of the two preceding workers and used the drug for the control of tetanic convulsions in man. Following these investigators, Blake, Logan, Miller, Hessert, Kocher, Robertson, and others, published findings which agreed with Meltzer and Auer.

My attention was first called to the possibility of using magnesium sulphate hypodermically for the control of the convulsions in eclampsia, by a paper read by Smith and Leighton, of St. Louis, in 1923. They reported eight recoveries from tetanus in which this drug was used in conjunction with tetanus serum. Immediately after the reading of this paper we began using magnesium sulphate in eclampsia, and on November 9, 1923, I reported ten cases before the St. Louis Gynecological Society. Since that time Lazar, of Los Angeles, and Alton and Lincoln, of Worcester, Mass., have reported a number of cases in which they have used the drug. While the two papers dealt with the use of magnesium

\*Read at the Thirty-eighth Annual Meeting of the American Association of Obstetricians, Gynecologists, and Abdominal Surgeons, held at Hot Springs, Va., September 16, 17, 18, 1925.



sulphate intravenously, we have given the drug intramuscularly only, believing that there is much less danger from any toxicity, and I believe that our results have at least been as good as theirs.

All of the writers herein mentioned have laid special stress upon the anesthetic and relaxing effect of magnesium sulphate, giving little, if any, attention to an additional, if not one of the most important effects of the drug, namely, the marked effect it has on the reduction of the intracranial pressure. This last point has been brought out very forcibly by two other men who were working along entirely different lines from the writers mentioned, Max M. Peet, of Ann Arbor, and Chas. E. Dowman, of Atlanta.

In the thirty-eight cases upon which this paper is based, we have used the drug by injecting it deep into the gluteal muscle, and have used it to the exclusion, practically, of all other forms of medication, such as morphine, veratrum viride, chloral, bromides, and luminal. None of these patients were bled, nor was there a spinal puncture done. Several of the patients were extremely violent, and while the magnesium sulphate stopped the convulsions, it did not seem to quiet them. We see no reason why morphine cannot be employed in the postpartum convulsions, but we did not use it as we wished to see how far we could go without its use.

We began using a 50 per cent sterile solution of magnesium sulphate, but changed to a 25 per cent solution as we feared the toxic effect of the drug. The solution we are now using was made especially for us by one of the large pharmaceutical houses, and is a triple crystallized, sterile, nonanhydrous solution, put up in 15 c.c. ampules. We have not been governed by the blood pressure or the body weight of our patient, when injecting the solution, and give as an initial dose 15 c.c. in the buttocks, and do not fear to give this same amount every hour if necessary, but it is seldom necessary to give it at such short intervals. We have been guided entirely by the frequency and severity of the convulsions and the general condition of the patient. There has as yet been no respiratory disturbance of any kind, but we have been prepared at all times to give an injection of 1 c.c. of calcium chloride intravenously, should our patient manifest any ill effects from the magnesium sulphate. Several of the cases have received as high as 100 c.c. of the drug within twenty hours without any perceptible reaction. In talking with Professor Auer in regard to the intramuscular injections, and the size of the dose we are in the habit of giving, it was his opinion that we could use this large dose because of the fact that the gluteal muscle into which we injected the magnesium sulphate is a very coarse, thick-fibered muscle, and that therefore the absorption is rather slow.

In regard to the action of the drug, it has been noted that the effect varies in different cases, but seems to have a much more rapid effect in those cases where the patient receives the injections early and has had



only a few convulsions. In several cases, we have noted that there have been no more convulsions after the first injection. In the majority of cases there is a marked relaxation of all the voluntary muscles, while if the patient is in labor there is absolutely no effect upon the uterine contractions, nor has it any effect upon the blood pressure or pulse rate. While there is no purgative effect noticeable, we believe that it has a diuretic effect, as in numerous instances our patients passed large quantities of urine within twenty-four hours after the beginning of the injections. The only other form of treatment that these cases received was the introduction of 60 c.c. of a saturated solution of magnesium sulphate into the stomach, for its purgative action, and in the majority of cases, the use of a hot moist pack.

While we do not claim that the eclamptic convulsions can be stopped by the use of magnesium sulphate, we are positive that they can be controlled, and that it most certainly aids in the more rapid recovery of the patient, and we are sure that it has been the means of saving the lives of a considerable number of our cases. All of the eclamptics are considered primarily as medical cases and are treated accordingly, and it is not until we have the situation well in hand that we think of the case as an obstetric one. Of these cases that were not in labor when first seen, labor was induced in all by means of the modified Vorhees bag. The method of delivery depended upon the indications presented, but in no case was delivery hastened, nor did we think it necessary to perform cesarean section. In all of those cases coming under our care where there was a living fetus present, we were able to obtain a living child upon delivery.

Among the thirty-eight cases treated, there were two maternal deaths; one patient died on the tenth day postpartum from a cerebral hemorrhage, having developed a hemiplegia the previous day. The second woman entered our service in deep coma, having had fourteen convulsions before the treatment was commenced. She never rallied and died within twelve hours. Of the fetal deaths, there were nine; four babies were macerated, four were premature, weighing under 1300 grams, and died within two hours. One death was inexcusable in that a high forceps was done against the consultant's advice, and the baby died in three hours from an intracranial hemorrhage, due to a fractured skull from poorly applied forceps. (This was a fullterm infant.) There was one pair of twins, both lived. There were twenty-nine primiparae, four para ii, two para iii, and two para iv. Labor began spontaneously in twenty-five cases and was induced by means of the bag in thirteen cases.

The average age of the patients was twenty-three years, the youngest being fourteen, and the eldest thirty-two years.

The statistics covering the number of convulsions in the different cases are rather indefinite, due to the fact that it was next to impossible

to obtain a definite history from the patient or her family as to the exact number of convulsions the patient had before coming under our care. The total number of convulsions and the number of convulsions before and after receiving the injections of magnesium sulphate differ so in each case that only a detailed report of each individual case will bring out these points. The figures for the time of the beginning of the convulsions are divided into antepartum, intrapartum, and postpartum, but in the majority of cases those patients who had convulsions during labor and after delivery showed marked toxemia, even before they had convulsions. There were twenty-eight cases in which convulsions began before labor set in, two cases in which convulsions began during labor, and eight cases that had postpartum convulsions. In a series of thirty-eight consecutive cases herein reported there were ten cases that had no convulsions after the first injection of magnesium sulphate. While the delivery of the patient has a very marked influence upon stopping the

TABLE I

CASE NO.	TOTAL NO. OF CONVULSIONS	CONVULSIONS AFTER HYPO.	CONVULSIONS AFTER DELIVERY
1	11	7	11
2	18	10	4
3	13	2	0
4	7	1	3
5	9	5	0
6	1	0	1
7	4	0	0
8	17	5	0
9	10	2	0
10	1	1	0
11	10	8	1
12	4	3	2
13	7	2	7
14	4	0	0
15	4	0	0
16*	1	0	0
17	9	1	0
18	3	1	0
19	8	3	8
20	6	5	0
21	4	3	1
22	10	6	7
23	16	2	16
24	6	0	0
25	2	0	2
26	3	0	1
27	6	3	0
28	14	4	0
29	5	1	0
30	3	2	0
31	1	0	0
32	5	4	0
33	7	1	0
34	8	2	2
35	2	1	0
36*	28	12	28
37	6	2	0
38	1	0	0

\*Died

convulsions, we are of the opinion that delivery under any circumstances should not be hastened, and the fact that twenty-two of the cases had no more convulsions after delivery does not mean that the delivery of the patient is the only method by which the convulsions can be eliminated.

#### CONCLUSIONS

1. The intramuscular injection of magnesium sulphate in 15 c.c. doses will control the convulsions of eclampsia.
2. Fifteen c.c. as an initial dose is not toxic.
3. This method of treatment not only relaxes the patient but decreases the intracranial pressure by relieving the cerebral edema, stimulates diuresis, and aids in the diminution of the general edema.
4. Eclampsia is primarily a medical condition and secondarily an obstetric problem.
5. Any method for the hastening of delivery of the patient is not only unnecessary, but adds greatly to the morbidity of the case.

UNIVERSITY CLUB BUILDING.

(For discussion see page 262.)

#### THE PREVENTION OF STILLBIRTHS\*

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THERE is no particular difference between the unborn babe and the newborn except in the mode of sustenance. There has been much publicity in matters of education relative to the preservation of health and life of infants, and these efforts should be as zealous in the conservation of the lives of the unborn babies.

The prenatal centers try to teach simple facts concerning pregnancy and the unborn child and deserve the unqualified support of our profession. The mother should be taught that habits of moderate daily activity, with the usual duties of everyday life and a diet of plain, wholesome food, are necessary for the development, nutrition, and growth of the fetus. The sphere of the prenatal center is unique, dealing with the prevention of complications and the supervision of nutrition of the unborn child. The causes of stillbirths may often be prevented if intelligent and systematic instructions are given to the parents.

Some of the most frequent causes of stillbirths are: syphilis, placental disturbances, disproportion between fetus and pelvis, malpositions, prematurity and postmaturity, accidents of childbirth, toxemia, and slovenly obstetrics.

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Syphilis has its own record in the number of stillbirths and should be diagnosed and treated to lower this mortality.

Premature separation of the placenta, low implantation, and placental apoplexy are often unavoidable, and may terminate disastrously for both mother and fetus. The successful management of these cases of placental disturbance depends upon the attending physician, whether he be capable of coping with these serious situations. If he is not, and the environment is such that the best surgical technic cannot be employed, then arrangements to secure efficient obstetric service in a hospital should be made, so that the patient may receive every surgical advantage with competent assistants to prevent complications. It is known that the loss of blood from a prematurely separated placenta exacts a heavy toll on fetal life, and to prevent loss of life, this situation must be met boldly and rationally.

All pregnant women, whether apparently healthy or not, should have a complete physical examination early in pregnancy. Functional defects should be discovered early and corrected, and such treatments and operations should be made as will add to the safety of both mother and baby. Only by thorough examinations may we know the true physical condition of the pregnant mother and her potential fitness to give birth to her baby. It is necessary early in pregnancy to accurately determine the condition of the heart, lungs, kidneys, and other organs, and to diagnose and treat various infections of the blood. Tests of kidney function and chemical analysis of the blood should be made if there are indications. Chronic nephritis, that otherwise might not be recognized, may be diagnosed by this examination early in pregnancy, and thus prevent toxemia, a serious complication of pregnancy, which ranks high in the cause of stillbirths.

The inlet and outlet of the pelvis should be accurately measured early in pregnancy. Too often the measurements of the outlet are neglected, assuming that a knowledge of the inlet is sufficient. Occasionally we find that the obstruction is at the outlet, and at delivery, the fetus is crowded or dragged through because the outlet has not been measured, which is an index of careless and slovenly obstetrics.

It is as important to recognize the prematurity, maturity, and post-maturity of a fetus as it is to have a knowledge of the size and shape of the pelvis. The measurements of the fetus may be made as accurately as the measurements of the pelvis. Repeated measurements of the fetus develop judgment in estimating its size and maturity. The fetus and pelvis should always be studied in relation to each other, and not separately, as is frequently done. The mechanics of labor, together with a knowledge of the relationship between the fetus and pelvis must be known in order to intelligently conduct labor with little injury to the fetus.

Examinations to determine presentation and position, and measure-

ments of the fetus for maturity should be made often enough during the last six weeks of pregnancy to know that the condition of the mother and fetus is normal. Malpositions and postmaturity should be recognized before the onset of labor. Malpositions should be corrected; breech presentations should be converted into cephalic whenever possible; and a follow-up treatment instituted to prevent a return to abnormality. Ahlfeld's, Perret's, and McDonald's rules will diagnose maturity and postmaturity of the fetus if made with the same precision as is exercised in the diagnosis of a heart lesion, or in taking the measurements of the pelvis to determine its size and shape.

If the disproportion between the fetus and pelvis is such that delivery is impossible through the birth canal, then cesarean section is warranted; if the disproportion is moderate, the use of forceps may be required; while if the pelvis is moderately contracted, induction of labor and the delivery of a smaller fetus is the best and safest treatment.

Ordinarily, the induction of labor is not justifiable before the thirty-sixth week, or until the weight of the fetus is twenty-four hundred grams, its length forty-eight centimeters, and an occipitofrontal diameter of ten centimeters; the two latter measurements are usually in direct proportion to each other and are essential in determining the size of the fetus. When labor is induced much earlier, the chances of life for the fetus are lessened because the blood vessels are fragile, easily broken, and the fetus is unable to withstand traumatism. A premature fetus is susceptible to injury during labor and, as a protection, the cervix and perineum may be dilated, but the membranes should not be ruptured so long as they act advantageously. An unborn fetus is protected in its uterine environment by the placenta, which stands between it and many pathologic invasions.

The recognition and correction of malpositions should be made several weeks before the onset of labor; and a failure to do this results in the loss of thousands of babies annually. Whenever possible, breech presentations should be converted into cephalic by external version. This should be done about the eighth month, and quite often is accomplished without the patient being aware of it. Francis J. Browne,<sup>1</sup> of Edinburgh, has said that in breech extraction, brain injuries are far more frequent and severe than in cephalic deliveries. He further states that "the liability to cerebral hemorrhage in premature infants is the greatest at from seven to seven and a half months, still considerable at eight months, while at eight and a half months the liability would appear to be no greater than at full term. Further, no case of cerebral hemorrhage occurred in a full-time child in which delivery was a natural vertex." He further arrived at the conclusion "that the liability to cerebral hemorrhage in premature infants is sixteen times that of those at full time,—taking 3 per cent as the normal frequency of breech de-

<sup>1</sup>British Med. Jour., 1921, II, 140; 1922, II, 590.

liveries, it is evident that the liability to cerebral hemorrhage in breech presentations is ten times that in vertex."

We are aware that extensive injuries in the tentorium of the brain occur more frequently from breech deliveries and forceps operations, and we know, too, that these injuries may occur in spontaneous and prolonged deliveries, yet we must recognize the fact that the prevention of stillbirths rests in the prevention of difficult labor, whether they be breech or vertex.

Occipitoposterior positions occur quite frequently in the average obstetric practice. The diagnosis of an occipitoposterior position is not always easy; however, the suggestive cardinal diagnostic point is the finding of the os high in the hollow of the sacrum. Occipitoposterior positions occur frequently in elderly primipara, in patients who have gained excessively in weight, in patients with postmature babies, and in patients who have contracted or moderately contracted pelves.

In many instances, a gain of twenty or more pounds above the standard weight of the patient will cause complications with occipitoposterior positions and a delay in labor. If fat and superfluous tissue is stored up in the body, it is reasonable to suppose that some thickening and enlargement of the pelvic tissues and muscles will occur which will reduce the size of the pelvic canal.

The treatment of most cases should be conservative, with the administration of sedatives to relieve pain and obtain rest. This conservative treatment, however, should not be carried to the extreme and permit the patient to become exhausted before interference is made to convert the posterior into an anterior position. Buist's two towel method is an excellent treatment in securing anterior rotation. The theory of Buist's method is that as the contractions occur, the pressure on the back of the fetus is such as to cause it to rotate anteriorly. In my personal work, I have found Buist's method, together with the use of sedatives, to be an excellent procedure for the conservative treatment of posterior position.

In patients who have not gained excessively above their standard weight, the uterine contractions are more regular and of longer duration, and this tends to secure flexion and anterior rotation. Should flexion and engagement take place, and arrestment later occur, then manual rotation with forceps may be necessary. Probably in some cases version may be justified when the head will not engage. Occipitoposterior positions cause more difficulty at delivery than other complications because the mechanism of labor is not thoroughly understood by most physicians. The physician fails to diagnose the position and assist in the correction. Postgraduate courses in obstetrics, and better teaching in our medical schools will assist in relieving this situation by concentration in teaching the mechanism of labor. However, regardless of the method used, the obstetrician must be alert, he must



accept his responsibility and render service according to his own judgment and knowledge of the science of obstetrics. Fear and expediency should not influence him to resort to radical measures. He should be bold enough to assume command should nature falter, and, promptly, not hastily, terminate a condition which may become dangerous to both mother and baby.

A delivery through a normal size pelvis of a postmature fetus with excessive ossification of the fetal head is as hazardous to fetal life as a delivery of a normal size fetus through a contracted pelvis. When the date of parturition has arrived, which has been determined from the last menses and quickening, and the measurements of the fetus will diagnose its maturity, the termination of pregnancy should be considered. Labor may be induced in many cases with castor oil, and quinine, and should this measure fail, then the bougie or hydrostatic bags may be used. The most promising field in the prevention of stillbirths is in the prevention of complications of labor, and postmaturity.

Asphyxia is a symptom and in its treatment the probability of a brain injury should be considered. Sometimes the cord may be the cause of asphyxia, due to prolapse, either frank or concealed, or due to pressure of the symphysis on the cord when around the neck of the fetus. Asphyxia and death may also result from trauma, and infections of the placenta and membranes which may cause a disturbance of fetal circulation. Auscultation of the fetal heart should be frequent during labor, and especially is this necessary during the second stage. The condition of the fetus must be followed carefully in malpositions, especially breech presentations, occipitoposterior positions, and in prolonged labors. It is the slow and irregular fetal heart that indicates danger, while the increased fetal heart sound does not signify any particular complication.

The treatment for the prevention of asphyxia is in the correction of malpositions; the limitation of oxytoxics in normal labor; the relief of frequent and prolonged uterine contractions by the use of morphine and other anesthetics; an episiotomy, if necessary, releasing pressure on the brain, and, if indicated, the prophylactic use of forceps. The treatment of the symptoms of asphyxia should not be radical, but well-planned, with the execution of timely therapeutic measures for shock. After the delivery of the head, there is an interval before the next uterine contraction which expels the shoulders and body. During this period, attention should be given to the removal of mucus and blood from the nasal and air passages to prevent inhalation with the first respiration. If the physician does not attempt to stimulate uterine contractions during this period, but devotes his time to the cleansing of the nose and mouth of blood and mucus, much toward the prophylactic treatment of asphyxia has been accomplished. After delivery, the baby should be wrapped in a warm blanket, mucus and blood removed

from its mouth and air passages, and head lowered and well supported to prevent further injury. It is very essential that the baby rest. Attempts to stimulate respiration should be gentle, and not frequent. Massage over the chest and cardiac region may be made, but not roughly. Mouth to mouth breathing, with proper protection for the baby by sterile cloth, may be resorted to in desperate cases. Throwing the newborn over the physician's head, or the use of ice or cold water dip, are obsolete in the treatment of asphyxia. It is a thoughtless method to handle the baby roughly for resuscitation, and thus rob it of its last chance of life. The baby should be closely observed for several hours, and also during the next few days for symptoms of brain injury; such as, failure to nurse, drowsiness, twitchings, eye symptoms, convulsions, and, later, jaundice. If in doubt as to a brain injury, or if diagnosed, spinal puncture is indicated. If the baby has been injured, whole blood or other remedies to reduce the clotting time of its blood should be given. The child who has been injured at birth presents an economic problem which is of concern to both the medical profession and the general public.

Many unnecessary operations are done at delivery for insignificant reasons; however, an experienced obstetrician may interfere when necessary to reduce birth injuries and lower fetal mortality. Certain conditions arise which call for extreme measures, which, if left to nature to correct, would mean death to both mother and baby.

Toxemia of pregnancy is a preventable disease. Eclampsia may be prevented by proper hygiene; limitation of the diet to prevent excessive gain in weight over the standard weight; proper elimination; and adequate and intelligent supervision of the physician by giving instructions to the patient each week. Intelligent prenatal care will usually prevent toxemia of pregnancy, the cause of many stillbirths. If eclampsia should occur in a patient who is directly under the supervision of a physician, it usually may be considered as an indictment of the service of the physician, or the cooperation of the patient. The most competent teachers should teach normal obstetrics, and teach that eclampsia and its symptoms are preventable. The judgment of an experienced and well-trained obstetrician is needed, and his value is immeasurable in order that results may be obtained in preventing normal cases from becoming pathologic. Should early symptoms of toxemia arise, the patient should be put to bed that she may rest; the diet should be limited, decreasing the amount to nil if her condition warrants it; and the elimination should be increased. With this treatment, the symptoms of toxemia will usually disappear; however, if not, probably the patient may be carried until past the thirty-sixth week, when labor may be induced.

An unexpected delay in labor does not necessarily mean immediate

operative interference, but probably in many cases all that is necessary is rest and relief of pain for the patient.

The study of the causes of stillbirth indicates that the methods of delivery, as practiced by the average physician, should be improved. More clinics should be available for the doctors in general practice that they may be given the opportunity to correct their errors, improve their technic, and understand the mechanism of labor. The zeal for surgery has led many an unqualified doctor to operate, diverting the delivery from the vaginal route and substituting for it abdominal section. The problem of the prevention of stillbirths may be essentially solved by the medical schools, medical associations, and well-organized clinics having the primary idea of teaching students and physicians to become qualified for safe and competent work in obstetrics and to be able to skillfully manage a nonoperative labor.

During the last few years much attention has been given to the use of anesthetics to lessen pain during labor. The doctors in the rural districts are rapidly adopting measures for the relief of their patients. They are seeking assistance in educating and teaching rural women the necessity of reporting their pregnancy in advance of labor that they may have the opportunity to instruct these patients in antenatal care and thus materially lower the fetal death rate. Competent physicians should be sent into the rural districts to teach the essential facts of prenatal care and the symptoms which complicate pregnancy that the vision for a greater work in obstetrics in the prevention of stillbirths may be realized.

During the next decade, the greatest advancement in preventive medicine will relate to the care of the pregnant mother and the newborn infant. Stillbirths are largely preventable by prenatal supervision, and the only adequate treatment is in the relief of conditions which may cause death to the fetus. As a moral obligation, greater efficiency in obstetrics must be achieved that the immediate benefit of better health for the mothers of our country may be the result, and that the lives of the unborn babes may be saved.

*(For discussion see page 263.)*

## REPORT OF A CASE OF A MESENTERIC CYST\*

BY EDMUND D. CLARK, M.D., INDIANAPOLIS, INDIANA

IN THE sixteenth century a Florentine anatomist, Benivieni,<sup>1</sup> described mesenteric cysts as "anatomical curiosities," and a few other writers of the sixteenth and seventeenth centuries reported cases of this condition. In 1803 enough cases had been reported so that Portal<sup>2</sup> classified them. Rokitsansky<sup>3</sup> (1842) is regarded as the first to describe chylous cysts of the mesentery. In 1886, Angagneur<sup>4</sup> found that eighteen out of ninety tumors of the mesentery were cystic, and Bramann,<sup>5</sup> in that year, reported the first case treated surgically; Kilian's case was reported two months later. Hahn,<sup>6</sup> in 1887, gave a résumé of the subject and classified these cysts as blood cysts, serous cysts and echinococcus cysts. Arekion,<sup>7</sup> in his Paris Thesis (1891), referred to 81 reported cases. In 1892, Bragnehaye<sup>8</sup> added twenty-three cases to this number, making a total of 104 cases up to that date. Moynihan,<sup>9</sup> in 1897, contributed a comprehensive article, in which he reported nine additional cases. In 1900, Dowd<sup>10</sup> made a historical study of the literature of mesenteric cysts, and found records of 32 additional cases, making a total of 145 cases. Many of these cases, however, were not reported sufficiently in detail to make them really intelligible. In 1906, M. F. Porter<sup>11</sup> collected the literature on the subject of chylous cysts, and since that time a number of papers have been published reporting cases of mesenteric cyst, among them those of Niosi,<sup>12</sup> Colmers,<sup>13</sup> Istomin,<sup>14</sup> Heyerowsky,<sup>15</sup> Chomsky,<sup>16</sup> Benedict,<sup>17</sup> Winslow,<sup>18</sup> Shands,<sup>19</sup> Carter,<sup>20</sup> Forster,<sup>21</sup> and Pietti,<sup>22</sup> who has contributed several articles on the subject. Recent authors agree in estimating that about 300 cases of mesenteric cyst, including all varieties, have been recorded in the literature. Of these the great majority were located in the small intestine, and only about 10 per cent of them were connected with the mesentery of the colon (Humiston and Pietti). Many more cases are being reported than formerly, and it is not at all unlikely that a clinical diagnosis of this condition will be made more frequently than has been the case in the past if surgeons in examining cases of abdominal tumor will bear in mind the possibility of mesenteric cyst. The condition is still sufficiently rare and difficult of diagnosis to justify the reporting of all cases.

In view of the supposed rarity of mesenteric cysts, it is of some interest that Dr. O. G. Pfaff<sup>23</sup> has reported two cases of this condition, the second before the American Association of Obstetricians and Gynecologists.

\*Read at the Thirty-eighth Annual Meeting of the American Association of Obstetricians, Gynecologists, and Abdominal Surgeons, held at Hot Springs, Va., September 16, 17, 18, 1925.

cologists, in 1905. At that time Dr. Pfaff stated that the fact that two cases had come under his observation within a period of a year and a half induced him to think that these growths might be more numerous than has generally been believed. The first of Dr. Pfaff's cases was a chylous cyst, which was enucleated. In the second case, as enucleation would have necessitated a difficult resection, drainage was instituted. Both of these cases made a good recovery. In the second case the cyst wall was examined, but the pathologist failed to find any trace of epithelium. Pfaff thought that underlying the apparent sudden development of these tumors could be found the fact that the mesentery allows such great mobility that the growing cyst may have been for years reposing in the pelvic cavity, and is only dislodged by the violence of some extraordinary exertion or accidental occurrence, which brings it for the first time into a position which forces its recognition by the patient or his physician.

Among the recent reports of cases of mesenteric cyst is that of Dr. Robert A. Milliken,<sup>24</sup> published in the *Journal of the Indiana State Medical Association*, December 15, 1924. In this case, which was diagnosed as an ovarian cyst, the omentum was found broadly adherent to the anterior abdominal wall at its edge, and a cyst was found in the mesentery of the terminal ileum, extending about eight inches up from the ileocecal juncture. This case was treated by marsupialization and terminated in a good recovery. There was no recurrence up to the time when the report was published. In this case no histologic examination was made of the lining.

#### CASE REPORT

Mrs. E. C., aged fifty-one years, a housewife, married, was admitted to the hospital on December 29, 1924, because of a large tumor mass in the abdomen and rapid loss of weight.

**Family History.**—The patient had been married for nineteen years; no pregnancies. Her husband was living and well. Her father died of apoplexy at the age of eighty-seven years. Her mother died of pneumonia at fifty-three. She was the third of four children. One sister died of heart trouble at the age of sixty-four years. There was no history of tuberculosis, lues, or cancer.

**Personal History.**—The patient had never been in good health. She had had the usual childhood diseases, and also pneumonia when a child. In 1919, she had an attack of influenza. She had always suffered from chronic constipation which had become more marked during the last five years. Her pulmonary condition was normal, except for occasional colds. Her heart had always been weak, it was rapid and skipped beats. The patient stated that the heart condition became aggravated about four and one-half years ago following an abdominal operation.

Notes on the patient's history at that time are as follows: Five years previously the patient had an attack of pain in the left lower quadrant of the abdomen. The pain was not exceedingly sharp and was not associated with vomiting. She was in bed, however, for seven weeks. There was no leucorrhea, but considerable dysuria. Shortly after this the patient noticed a growth, or "hardness" as she expressed it, in her abdomen. About two years previously she had had an attack of lameness



amounting to severe disability in her right leg, but this cleared up in about four weeks. She noticed meanwhile that the abdomen was increasing slightly in size. She then had another attack of pain in her right side and consulted her physician who advised her to come for operation.

Physical examination at this time showed a thin, pale woman. Examination of the head, heart, lungs, and extremities was negative. Palpation of the abdomen revealed a mass the size of a grapefruit, situated in the midline above the symphysis. There was distinct tenderness in the left side, but none in the midline. Vaginal examination showed that the mass was probably a uterine fibroid, about the size of two closed fists. There seemed to be some involvement of the left adnexa also. The blood count showed 7,000 white cells and 75 per cent polymorphonuclear leucocytes.

Operation was performed February 28, 1920. Under ether anesthesia, the abdomen was opened through a midline incision extending from the umbilicus to the pubes. The uterus was small and atrophic, situated a little to the right of the midline deep in the pelvis. The pelvis was filled for the most part by a firm, smooth, spherical mass occupying the position of the left ovary. There was some free fluid in the abdominal cavity. A supravaginal hysterectomy and left salpingo-oophorectomy were done in the usual way. The appendix was removed as an incidental measure and the abdomen closed in layers. The patient was in good condition at the end of the operation.

*Present Illness.*—About a year ago, before her present admission to the hospital, the patient first noticed a definite tumor mass in the form of a small "knot-like" affair in the right iliac region. Two months prior to admission there was a sudden increase in the size of the tumor, and since that time it increased in size alarmingly. The patient states that her loss of weight began four years previously, following the abdominal operation, and as before noted, she thinks the operation left her with a "bad heart."

*Preoperative History.*—Shortly after admission the patient developed an upper respiratory infection which finally involved the trachea and upper bronchi. This, and the heart condition (due to increased thyroid activity of mild degree) delayed operation until January 6, 1925.

*Operation.*—Operation was performed on January 6, 1925, under gas-ether anesthesia. Through a midline incision the tumor mass was exposed, which although in the pelvis, was not attached to the pelvic organs but was encased in the abdominal mesentery. The mass was about eight inches in diameter, rounded in form, and was in the mesentery of the transverse colon. Its mesenteric attachment was about three inches in extent; it was so intimately connected to the colon that it appeared as though it might be a part of that viscus. It was found however, that the tumor could be dissected free from the colon without seriously lessening the blood supply; therefore, it was not necessary to resect any portion of the bowel. After freeing the tumor from the colon, numerous bleeding points were ligated, and the site of the attachment of the tumor to the colon and mesentery was closed with running, interlocking, plain No. 1 catgut sutures. Careful exploration of the abdominal organs revealed no other abnormality. The abdomen was closed in the usual manner.

*Postoperative History.*—The patient was returned to her room in splendid condition. Postanesthetic nausea and vomiting were slight and had subsided entirely at the end of ten hours after operation. With the exception of slight gas pains and slight cough, which developed on the fifth day, convalescence was uneventful, and she was sitting up in a chair on the fourteenth day after operation. She was discharged from the hospital on January 30 in excellent condition. A letter received from the patient on September 24, 1925, reports her condition as good.

*Gross Specimen.*—The tumor measured 130 mm. in diameter; its weight was 3.5 pounds. Its attachment to the colon measured 60 mm. in length and 5 mm. in



width. The surface of the tumor was well supplied with blood vessels. There were cysts 20 mm. in diameter in the form of nodules on the surface of the mass. The contents of the cyst consisted of a yellowish, gelatinous material mixed with blood. The cyst was made up of multiple membranous cavities.

*Microscopic.*—The walls of the cyst were thin and composed of a cobweb-like deeply pink staining connective tissue, poor nuclei and moderately infiltrated with patches of small round cells, mixed with infrequent groups of polynuclears. Occasionally in the smaller cysts one made out an endothelial lining, but the larger cavities were quite uniformly bare. The blood vessels were numerous, large, and without walls except for the endothelial lining. Differential stains failed to show smooth muscle.

*Etiology.*—The pathogenesis of mesenteric cysts has not been satisfactorily determined. Histologic examination of cyst contents and tissues removed at the time of examination has failed to disclose whether the cysts are of embryonic origin or the result of degenerating lymph glands; whether they are ruptured or dilated lymph vessels or dilated lacteals, or whether they originate in the intestines. Most observers think the cause is a degeneration of the lymphatic glands, the efferent vessels being closed and thus giving rise to a retention cyst. The tumor grows between the layers of the mesentery, and may contain from a few drams to a quart or more of fluid. Carter<sup>20</sup> says, "There is no doubt that many, if not most, of these true cysts are embryonal in origin; others may arise from Meckel's diverticulum, or from sequestration from the bowel during development; also obstruction to the lymphatics or lacteals may result in cysts in certain cases." Porter and Moynihan believe that these cysts have a multiple origin. Benedict, who analyzed a series of 97 cases of mesenteric cyst, found them about equally divided as regards sex. They were found in patients of all ages, ranging from one to eighty years of age. In this series of 97 patients, 60 recovered, 14 died after operation, and in 12 cases the diagnosis was made at necropsy, sometimes after many years' duration and sometimes after death due to other causes.

*Symptoms.*—There are no signs or symptoms which are pathognomonic of mesenteric cyst. According to Porter, pain is more frequent with this condition than with any other type of abdominal tumor. A history of repeated attacks of abdominal pain associated frequently with vomiting, and often with alternating periods of diarrhea and constipation, is considered significant. These attacks, in Carter's opinion, are presumably due to increased peristalsis in an effort to overcome the narrowing of the bowel produced by the encroachment of the cyst upon the lumen of the gut; they may also be due to attacks of partial volvulus. Shands says that if the disease has any characteristic symptoms it is the presence of a cystic abdominal tumor, centrally located, and possessing an unusual degree of mobility. Carter agrees that these tumors are characterized by their extreme mobility, both laterally and also, to a lesser extent, longitudinally. This, however, does not apply to a tumor

completely filling the abdominal cavity. He points out further that the cyst is frequently surrounded by an area of gas-filled bowel, which gives a resonant note on percussion; occasionally a loop of bowel may cross the anterior aspect of the cyst, giving rise to a band of resonance surrounded by a dull area. The x-rays may be of diagnostic value in certain cases by showing the relationship of the tumor to the lumen of the bowel and the amount of narrowing from pressure.

There can be no question that the diagnosis of mesenteric cysts is difficult in view of the fact that no case has been recognized with certainty previous to operation or autopsy. Small cysts may give rise to no symptoms whatever. Under these circumstances, acute appendicitis, volvulus, intussusception, rupture of a peptic ulcer, cholecystitis, rupture of an ectopic pregnancy, in fact, any or all acute abdominal conditions must be considered, as any of these conditions may be so closely simulated that preoperative diagnosis is quite impossible.

*Treatment.*—The treatment of mesenteric cyst, as of any other acute abdominal condition, is operative. There are five operative procedures which may be adopted: (1) Aspiration; (2) marsupialization; (3) incision and drainage; (4) enucleation, and (5) resection of the bowel, if this viscus is affected, together with excision of the cyst.

Aspiration is mainly applicable in early cases. Drainage is usually employed after preliminary incision or spontaneous rupture. Marsupialization is indicated when the cyst cannot be readily enucleated or excised. A review of the cases in which this procedure was adopted showed that recovery usually followed. The mortality does not seem to be dependent upon the method employed, but rather upon the essential features of the case, or the superior advantages of modern surgery, especially with regard to sepsis.

#### CONCLUSIONS

1. Mesenteric cysts are still sufficiently rare to justify the reporting of all cases.
2. These cysts should be studied with relation to their attachment and the histogenesis of their enclosing membrane rather than from the standpoint of their cystic contents.
3. There is no symptom or set of symptoms which is pathognomonic of mesenteric cyst. They may be simulated by any acute abdominal condition. In their earlier stages these cysts are more mobile than most other abdominal tumors.
4. The treatment is operative,—aspiration, incision and drainage, enucleation and resection of the intestine (if necessary), or marsupialization.
5. The prognosis is good.

## REFERENCES

- <sup>1</sup>Benivieni: Cit. from Niosi.
- <sup>2</sup>Portal: Cours 'Anat. med., Paris, 1803.
- <sup>3</sup>Rokitansky: Pathologische Anatomie, 1842.
- <sup>4</sup>Angagneur: Tumeur du Mesentere, Paris Thesis, 1886.
- <sup>5</sup>Bramann: Quoted by Porter, Ann. Surg., 1906, xliii, 380.
- <sup>6</sup>Hahn: Berl. klin. Wehnschr., 1887, p. 408.
- <sup>7</sup>Arekion: Tumeurs du Mesentere, Paris Thesis, 1891.
- <sup>8</sup>Bragnelhay: Arch. gén. de méd., 1892.
- <sup>9</sup>Moynihan, Sir: (Berkeley), Ann. Surg., 1897, xxvi, 1-30.
- <sup>10</sup>Dowd, Chas. N.: Ann. Surg., 1900, xxxii, 515.
- <sup>11</sup>Porter, M. F.: Ann. Surg., 1906, xliii, 380.
- <sup>12</sup>Niosi: Virchow's Arch. f. path. Anat., 1907, exc, 217.
- <sup>13</sup>Colmers: Arch. für klin. Chir., 1906, lxxix, 132.
- <sup>14</sup>Istomin: Kharkov. Med. Jour., 1910, ix.
- <sup>15</sup>Heyerowsky: Wien. klin. Wehnschr., 1908, vi, 185.
- <sup>16</sup>Chomsky: Surg. Arch. of Weljaminoff., 1913, xxix, 577.
- <sup>17</sup>Benedict, A. L.: Surg., Gynec. and Obst., June, 1913, xvi, 607.
- <sup>18</sup>Winslow, R. C.: Jour. Michigan State Med. Soc., 1915, xiv, 464.
- <sup>19</sup>Shands, H. R.: Southern Med. Jour., 1917, x, 484.
- <sup>20</sup>Carter, R. M.: Surg., Gynec. and Obst., November, 1921, xxxiii, 544.
- <sup>21</sup>Forster: Beitr. z. klin. Chir., 1921, exxiv, 116-138.
- <sup>22</sup>Pietti, E. C., and Humiston, C. E.: Illinois Med. Jour., 1925, xlviii, 93.
- <sup>23</sup>Pfaff, O. G.: Jour. Indiana State Med. Assn., 1905, v, 28.
- <sup>24</sup>Milliken, Robert A.: Jour. Indiana State Med. Assn., Dec. 14, 1925, xvii, 417-418.

HUME-MANSUR BUILDING.

(For discussion see page 267.)

## Department of Maternal Welfare

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CONDUCTED BY FRED L. ADAIR, M.D.

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MEETING OF THE JOINT COMMITTEE, WASHINGTON, D. C.,  
MAY 3, 1925

**T**HE chairman, Dr. Fred L. Adair, presided and presented the following report:

During the past year the committee has had about two hundred dollars available for expenses; fifty dollars of which was received from the American Gynecological Society, fifty dollars from the American Association of Obstetricians, Gynecologists, and Abdominal Surgeons, and one hundred from the American Child Health Association. This amount has been expended for postage, stationery, and a small amount of clerical help.

An attempt has been made to get in touch with all the county, district, and state Medical Societies in the U. S. A. with the idea of stimulating greater interest in improving the conditions surrounding maternity and early infancy. To that end the following letter was sent to the secretaries of these different societies. These letters were all prepared, the envelopes addressed, and sent to the members of the committee, who forwarded them with, in some instances, personal letters inclosed to the various secretaries in the states which were assigned to the committee members. A copy of the letter is as follows:

Dear Doctor:

We are communicating with you as the secretary of your Medical Society because we feel that the conditions surrounding maternity and early infancy are not as good as they might be.

We feel that these conditions can be definitely improved with a lessening of the mortality and morbidity of mothers and infants. We are certain that medical men and organizations can do a great deal to accomplish this saving of life and preserving of health among the mothers and infants of this country.

It is our belief that the members of the medical societies should have their attention called to these conditions and that the programs of the meetings should include more papers and clinics on one of the fundamental but rather neglected branches of medical and surgical practice. It is hoped that in this manner the practice of medicine and surgery as it affects mothers and infants can be definitely improved.

We are willing to help you and others carry out such a program, and ask the earnest consideration of these points by your organization. We are willing and glad to assist in carrying out a program which is calculated to increase obstetric knowledge and improve the practice among the medical profession.

If we can assist in securing speakers for your society or help in any

other way, kindly notify one of the members of this committee who will be glad to be of assistance.

Dr. George W. Kosmak, New York City, N. Y.  
 Dr. Henry Schwarz, St. Louis, Mo.  
 Dr. George Clark Mosher, Kansas City, Mo.  
 Dr. W. C. Danforth, Evanston, Ill.  
 Dr. Frank W. Lynch, San Francisco, Calif.  
 Dr. Robert L. DeNormandie, Boston, Mass.  
 Dr. Ralph W. Lobenstine, New York City, N. Y.  
 Dr. Fred L. Adair, Minneapolis, Minn.

All the states have been assigned to different members of the committee. The present assignment being as follows:

Dr. DeNormandie, Maine, Rhode Island, Massachusetts, New Hampshire, and Vermont.  
 Dr. Danforth, Illinois, Indiana, Iowa, Ohio, Nebraska, and Wisconsin.  
 Dr. Kosmak, Pennsylvania, Virginia, West Virginia, South Carolina, Mississippi, and Connecticut.  
 Dr. Lynch, California, Arizona, Nevada, Oregon, Idaho, and New Mexico.  
 Dr. Lobenstine, Delaware, North Carolina, New Jersey, Florida, New York and Maryland.  
 Dr. Mosher, Michigan, Arkansas, Missouri, Kansas, Oklahoma, and Texas.  
 Dr. Schwarz, Alabama, Colorado, Georgia, Kentucky, Louisiana, and Tennessee.  
 Dr. Adair, Minnesota, Montana, North Dakota, South Dakota, Utah, Washington, Wyoming, and the District of Columbia.

Each committeeman is endeavoring to secure some prominent obstetrician in each state who will take charge of the program to develop better obstetric practice among the physicians of his state. The committee has not attempted to do any work with the laity but desires simply to reach the medical men and attempt by this means to improve the everyday obstetric practice. The committee realizes that the necessity for this is not equally great in every state but is of the opinion that each and every state presents situations which are capable of improvement.

The committee at this meeting, which was well attended (only two members being absent), decided to push on further with its activities. In order to develop this program certain resolutions were drafted for consideration by the constituent societies.

I. Resolved that the Chairman of the Joint Committee be directed to communicate with the Rockefeller and Carnegie Foundations for the purpose of securing for this Committee an annual appropriation to further its efforts to develop education in Maternal Welfare among physicians in this country according to its adopted program.

II. Inasmuch as considerable controversy has arisen in various quarters with reference to the theoretical education of nurses in hospital training schools, it is resolved that there be formulated by the Joint Committee on Maternal Welfare a uniform syllabus of lectures in obstetrics, which shall meet the essential and necessary requirements of this subject.

III. It is resolved that as a measure to promote better care of pregnant women, with a corresponding reduction of maternal and infant morbidity and mortality due

to septic infection in hospital practice, the Joint Committee on Maternal Welfare advocates a detached and separate maternity service with its own personnel in all general hospitals admitting pregnancy cases and also recommends as an ultimate ideal that physically separated buildings be provided for this purpose when practical.

George W. Kosmak, M.D.

Henry Schwarz, M.D.

George Clark Mosher, M.D.

W. C. Danforth, M.D.

Frank W. Lynch, M.D.

Robert L. DeNormandie, M.D.

Ralph W. Lobenstine, M.D.

Fred L. Adair, M.D., Chairman.



## Society Transactions

AMERICAN ASSOCIATION OF OBSTETRICIANS, GYNECOLOGISTS, AND ABDOMINAL SURGEONS

THIRTY-EIGHTH ANNUAL MEETING

HOT SPRINGS, VA., SEPTEMBER 16, 17 AND 18 1925

DR. ASA B. DAVIS OF NEW YORK, PRESIDING

### Symposium on Appendicitis

**Five Kinds of Chronic Appendicitis**, by Dr. Robert T. Morris, New York City. (See page 180.)

**Chronic Appendicitis Considered from the Clinical and Pathologic Standpoint**, by Dr. Arthur E. Hertzler, Halstead, Kansas. (See page 155.)

**Appendicitis in Pregnancy**, by Dr. G. D. Royston, St. Louis, Mo. (See page 184.)

**Right Rotation of the Appendix from Congenital Bands as a Factor in the Etiology of Appendicitis**, by Dr. John H. Outland, Kansas City, Mo. (To be published in volume of Transactions.)

### DISCUSSION

DR. CHARLES GORDON HEYD, NEW YORK CITY.—We must be surgical fundamentalists and accept much of the pathology of chronic appendicitis on faith. It seems to me, however, a mistake to visualize the appendix as a single isolated organ with a symptomatology of its own. We should rather view the infected appendix as an irritated viscus that interferes with the harmonious action of the entire gastrointestinal tract.

A number of years ago we had occasion to tabulate the so-called "cures" of chronic appendicitis by appendectomy. We were greatly surprised to discover that those cases in which the appendix was removed for simple, localized, right sided pain were not cured, but the cases that had appendectomy for symptoms referable to the upper abdomen and in which there was no demonstrable pathology in either the gall bladder or the stomach were almost invariably cured. We have long ceased to hold to the term chronic appendicitis. It was interesting in this tabulation to find that there was almost universally a history of a previous attack of pain which could be logically interpreted as an acute attack of appendicitis.

In any broad review of the symptoms of disturbed function of the gastrointestinal tract we must look upon the alimentary tract as a living, muscular tube. If there is a disturbance in the course of this tube manifestations of irritability occur above and below the point of irritation. Let us conceive that we have a rubber tube

filled with water and that we hit it a sharp blow in the middle. From the place of impact there follows a wave of impulse appearing at either end of the tube. In like manner if there is an infection resident in the appendix it represents a focal infection and may express itself in irritability of the colon below or the small intestine and stomach above. Many an irritable colon has been cured by an appendectomy, because the irritating focus at the juncture of the large and small bowel has been removed. The stomach and large bowel are essentially the mouth-pieces for disturbances of function in the course of the alimentary tract. Under normal conditions of health the movements of the gastrointestinal tube are below the threshold of consciousness of the individual. The muscular or mechanical function of the intestinal tube is independent of nerves and nerve centers, yet we have eight focal or nodal points throughout its course that are capable of modifying the intrinsic muscular movement of the digestive tube, just as the bundle of His of the heart determines the rhythm and regularity of cardiac action.

At certain points in the alimentary tract we find definite specialized collections of nerve tissue which Keith has described and which behave in every way similar to the nodal tissue in the heart. Four of these nodal points are definitely established and four others may be surmised with reasonable certainty. Seriatim they are: (1) at the junction of the pharynx and esophagus, (2) at the cardiac orifice, (3) just beyond the pylorus near the ampulla of Vater, (4) at the duodenojejunal flexure, (5) the ileocecal sphincter, (6) about the midpoint of the transverse colon, (7) the junction of the pelvic colon and rectum, and (8) within the anal ring. The muscular activity of the tube is dependent, therefore, upon an intrinsic rhythmic tone with autonomous contractility and hence the contracting of any portion of the intestine will depend upon its tone, conductivity, irritability and intrinsic contractile rate. All muscular activity is influenced, in a large degree, by the available blood supply. Inflammatory processes are associated with hyperemia and local cell life or the intrinsic metabolism of the cell is accelerated by near-by inflammatory processes and hence one would expect in any inflammatory condition in the region of the cecum an increase in the irritability of the small intestinal tract above the point of inflammation.

The appendix participates in muscular contraction as does the remainder of the intestinal tract and one may assume that the appendix must have a bowel movement the same as the intestinal tract and the inability of the appendix to discharge its contents into the cecum can be accepted as evidence of stasis with or without changes in the appendix.

The appendix stands in anatomic relationship to the upper abdomen in three distinct ways: (1) by continuity of peritoneal tissue, (2) by the canalicular association of the lymphatics, and (3) by direct transportation of material through the ever widening tributaries of the portal veins. The fact that the liver is interposed between the portal system and the general circulatory system, would result in the liver receiving the main insult from any deleterious material, biotic or chemical that might be absorbed or conducted to it by the portal system.

In the course of our studies on the liver in relation to chronic abdominal infection, we were surprised to note the frequent association of various degrees of hepatic change in the presence of chronic abdominal infection. We undertook to determine whether, in undoubted cases of so-called chronic appendicitis there was a definite and sequential change in the histology of the liver. A chronically infected appendix was construed as one that showed either polymorphonuclear or round-cell infiltration, together with varying degrees of fibrous tissue hyperplasia or obliteration by fibrous tissue replacement. The appendix, in the cases representing our study, was the only organ at fault, and was proved to be the cause of the symptoms of which the patient complained. All the cases were without gastrointestinal ulceration and without any demonstrable disease of the gall bladder.

We occasionally removed a section of the right and left lobes of the liver in

cases of undoubted chronic appendiceal infection. We found, on histologic examination of the stained liver sections, a uniform tendency toward the production of varying degrees of interstitial fibrosis. This fibrous tissue hyperplasia and replacement was preponderantly disposed in one group of cases about the periportal fields and in the other group of cases about the biliary fields. Clinically, the chronicity of the process in the appendix, and apparently the degree of infectivity and virulence were essential factors in the hepatic response. In the mildest type, the liver changes were represented in the irregular intermingling of fibrous tissue with the columns of liver cells, together with an infiltration in the newly formed connective tissue.

With regard to the course of the lymphatics from the appendix to the upper abdomen we can define a series of hyperplastic glands from the ileocecal angle up to the second portion of the duodenum. If we inject the lymphatics of the omentum, we will find the terminal distribution of the dye in the subpyloric glands just beneath the pylorus. So constant has been the finding of hyperplasia of the subpyloric glands in chronic appendicitis that we have been able to predicate a chronically diseased appendix by certain signs that are demonstrable upon opening the abdomen in the region of the pylorus. These gastric stigmas of the chronically diseased appendix may ordinarily be observed in the course of an upper abdominal laparotomy. The signs are distinctive and taken together predicate a diseased appendix. They are: (1) a tumultuous contracture of the antral portion of the stomach, (2) hypervascularization of the pylorus and antrum, and (3) hyperplasia of the subpyloric glands. These lymph glands are three to four times the size of the normal, pink in color, do not show bacteria on culture and invariably are hyperplastic, and (4) the finding of a thin, web-like membrane, much like a spider's web, thrown about the pylorus. These four distinctive signs we take to be the gastric stigmata of chronic appendicitis and we believe that they are always present in the so-called pyloric syndrome of chronic appendicitis.

DR. WM. EDGAR DARNALL, ATLANTIC CITY, N. J.—I believe there is a distinct relation between the rotation bands and adhesions and what we used to call chronic appendicitis.

Dr. Heyd has very clearly pointed out the difference between what is diagnosed as chronic appendicitis,—pain and rigidity in the lower right quadrant, and that other group of symptoms which affect the stomach and the gall bladder region. He has also stated—and I agree with him—that those cases that were operated upon for upper abdominal symptoms were almost invariably cured, and that those cases that were operated upon for simple pain and rigidity and some other symptoms in the lower right quadrant were not cured. My observation has been that most of these cases where we used to operate for chronic appendicitis because we found rigidity and pain in the lower abdomen, making a two inch or an inch and a half incision and taking out the appendix which seemed almost normal, were not cured. Is it the appendix that is at fault, or is it the type of patient? Nearly all of those cases, it seems to me, belong to that group of patients with prolapsed kidneys and stomach, upper rotation of the colon, Lane's kinks, Jackson's membranes, and Treves' bands. Several years ago I used to feel it my duty whenever I had a case of that kind to go very carefully over it, relieve all the intestinal stasis and clean up all the bands. In a number of those cases we got very good results; in some of them we did not, as the bands would reform in new locations, and the general abdominal ptosis still persisted.

But, as a matter of fact, it seems to me that the thing that we have been calling chronic appendicitis is not so much a matter of the appendix itself as an organ, because often those appendices after being removed seem to be almost normal, but it is the pain down the right side which is mixed up with certain types of adhesions and bands and folds, most of which I suppose are now considered congenital, and unless we can prove by roentgen-ray studies and other methods of observation just

exactly what we have there, simply taking out the appendix and not looking for obstructive folds and bands,—at least those that are making trouble,—will not give us satisfactory results. The patient will have just as much pain and discomfort and, in her own language, she feels that her appendix has not even been removed.

**DR. LOUIS E. PHANEUF, BOSTON, MASS.**—In connection with appendicitis in pregnancy, Dr. Royston has emphasized some very important points, namely, lack of abscess formation, and a tendency to general peritonitis. In the late cases we find gangrenous ruptured appendices, frequently with beginning general peritonitis because of this lack of localization. One measure which saves a number of lives should be mentioned, and that is the question of enterostomy, usually cecostomy, in connection with appendectomy. A purse-string suture of catgut is placed around the base of the appendix; the appendix is removed, flush with the cecum; a No. 28 French catheter is introduced into the opening, secured to the edge of the wound with a stitch of catgut, and the purse string is tied. A second purse-string suture is usually used to make the catheter more secure in the intestine. This catheter is allowed to come out through a stab wound, and the abdomen is drained by means of a cigarette drain through the primary incision. I was led to use this method after seeing five advanced cases of peritonitis following ruptured appendices in connection with pregnancy during my house surgeon days. All five women died of general peritonitis within a short time after operation, an appendectomy and drainage having been done. I have saved a number of lives of late years by resorting to a cecostomy; I probably have done ten such operations, the last one having been done within the last six months. The patient had a gangrenous appendix with beginning peritonitis and was six months' pregnant. An appendectomy and a cecostomy were done; the fecal fistula healed spontaneously in three weeks and she was delivered at term normally. All the other patients miscarried.

This operation permits us to do three things: control distention, drain the bowel, and put glucose solution directly into the bowel. With the introduction of glucose solution at intervals, after two or three days, a spontaneous bowel movement usually occurs, and the intestine takes on its normal function. I believe that in advanced cases this method has great value.

**DR. STEPHEN E. TRACY, PHILADELPHIA, PA.**—The first essayist told us we have five types of chronic appendicitis; the second states there is no such thing as chronic appendicitis. Doctor Heyd has demonstrated that removal of the appendix cures many patients of upper abdominal symptoms.

I would like to cite two cases which we have operated upon within the last week. One patient was between four and five months' pregnant, showed marked tenderness in the right side of the abdomen and the urine was loaded with pus. My associate made a tentative diagnosis of pyelitis and appendicitis and she was treated for nearly four weeks. On my return to the city, examination showed acute tenderness in the right iliac fossa. Cystoscopic examination showed the bladder to be normal. Cultures from the kidneys were negative and the urine was free of pus. We made a diagnosis of appendicitis and removed the organ. At operation the appendix was found injected, thickened and there were recent adhesions, not congenital bands, between the appendix and the wall of the cecum. The operation cleared up the symptoms. I would like to know how Doctor Hertzler would classify this case.

The second case I saw in consultation in May. She had a marked pelvic peritonitis. The pelvic organs were one solid inflammatory mass. One doctor who saw this patient two years before, claimed she had appendicitis at that time. Another doctor claimed she had pyosalpinx. We treated her conservatively until she recovered from the acute symptoms; discharged her from the hospital and recom-

mended that she return in September. At this time examination showed adherent appendages with an extremely sensitive point immediately behind the cervix uteri. It was then recommended that she be subjected to operation. When the abdomen was opened the fallopian tubes were found to be edematous and adherent, but patulous, and I believe they will fully recover. The appendix was adherent down under the edge of the sigmoid which was pulled to the right side, and at the tip of the appendix where it was adherent, there was a concretion about 2 cm. in length. The appendix was not injected except about the region of the concretion. I would like to know how Doctor Hertzler, would classify this case.

Doctor Royston gave us an excellent presentation of gestation complicated by appendicitis. We all agree with practically everything he said. There is no doubt that appendicitis in the presence of a gestation is a serious complication and the pathologic progress is extremely rapid in its development; just as it is in children. Therefore, I feel appendicitis during gestation is a surgical condition from the moment of its first symptoms. Our results of operations in these cases have been most satisfactory. I am inclined to believe that the high mortalities recorded in the literature are from the statistics of a time when the mortality in all classes of appendicitis was much higher than it is at present.

DR. GORDON K. DICKINSON, JERSEY CITY, N. J.—Whereas the statement is given out broadly that chronic appendicitis does not exist, so I am teaching my internes that we have, specifically speaking, no such thing as acute appendicitis; that any man who operates should think pathologically, and that every time the appendix is diseased, no matter in what form, the entire organism more or less responds. I find that the liver is almost always affected in addition to the appendix, and when I say that there is no such thing as acute appendicitis I mean that the pathology is not local. It is a moving condition and every organ in the body responds more or less, generally the liver, sometimes there is a myocardia, often the spleen is involved. If we want to treat our patients properly, if we want to get the proper viewpoint to hand down, we should not operate for appendicitis alone, but ever keep before us the fact that it is a general pathology.

DR. JAMES E. DAVIS, DETROIT, MICH.—I think we can all conclude that the appendix is an organ of very great liabilities. One liability has perhaps not been emphasized sufficiently, namely, the decidual type of organ. Perhaps because of this very fact operators remove it, and for no other reason, just as the tonsils are removed and as teeth are removed. Any one who has worked in pathology will know that any number of tonsils are removed where there is no pathology present, and also that there are a great many appendices removed where there is no demonstrable pathology. Possibly the same is true of teeth.

Besides the decidual changes there are, of course, the changes due to infection. These have been sufficiently emphasized, but there is a liability to a particular type of change met with very frequently, namely, that of fecal stasis. As you routinely receive appendices for examination you are impressed more and more with the number that show only fecal stasis.

I cannot agree with Dr. Dickinson that there is no true appendicitis, because when there is fecal stasis or fecal concretions definitely obstructing the lumen of the appendix, a clear-cut local inflammation, gangrene, etc., may follow.

As to the chronic changes, there is no good and sufficient reason why we cannot have a chronic infection in this type of tissue just the same as we have chronic infection elsewhere. If you are going to rule out chronic infection here you should do it elsewhere. The difficulty arises in the recognition of what can be called a chronic change, and this is because it is a decidual type of organ. Very often this organ will undergo ordinary arteriosclerotic changes. The changes may progress quite rapidly and I see no reason why there should not be definite symptoms if the changes are very rapid.



As to the classification, the only way that I can see whereby we can reach safe ground is by correlation of the data concerning the case, which has been sufficiently emphasized. If this is not done, the pathologist surely cannot make decisions that amount to very much in those cases that may or may not be chronic changes, or that may be simply decidual changes. And again in the case of stasis there may be partial atrophy as a direct result of pressure from the static condition and which will give the same picture as the inflammatory changes. The other day I examined an appendix and felt sure from the gross appearance that it was an adenocarcinoma, but at the microscopic examination I was quite surprised to find a well-marked example of tuberculosis, with a great increase of the lymphoid tissue and the other classical conditions. I am very sure that the gross picture I had in this case and the picture we usually get in adenocarcinoma, might be said to be identical. This will point to one case where it was difficult to have decided this question upon arbitrary lines of diagnosis by the gross examination alone. We can only decide it after lines are drawn with careful correlation work in the clinical, gross, and microscopic examinations.

DR. MORRIS (closing).—Of the five kinds of chronic appendicitis that I mentioned, two are infective lesions and three are irritative lesions. Malignancy would make a sixth kind. That probably, however, does not belong to appendicitis as regards classification.

DR. HERTZLER (closing).—Referring to Dr. Heyd's remarks, I would suggest that some degree of caution is required in accepting his findings. Such groups of cells have been repeatedly described and ascribed to various causes. They are found in persons dying from accidents.

DR. ROYSTON (closing).—I must plead guilty to Dr. Hertzler's charge of making a diagnosis mainly on the presence of localized tenderness. Often the magic touch in the diagnosis of appendicitis is most helpful, in fact, essential. I do not believe that we should wait for symptoms referable to the upper abdomen. The very tender localized spot in the right flank is, I think, the only symptom of practical value so far as appendicitis in pregnancy is concerned.

### Symposium on Placental Pathology

**Case Report of Prolapse of the Placenta**, by Dr. M. Pierce Rucker, Richmond, Va. (For original article, see p. 189.)

**Treatment of Placenta Previa Based on 303 Consecutive Cases at the Boston Lying-In Hospital from 1895 to 1925**, by Dr. Foster S. Kellogg, Boston, Mass. (For original article, see p. 194.)

**Inversion of the Uterus**, by Dr. Louis E. Phaneuf, Boston, Mass. (For original article, see p. 171.)

### DISCUSSION

DR. JOHN O. POLAK, BROOKLYN, N. Y.—Dr. Kellogg's figures were most impressive and bring us back to a consideration of the conditions that determine the plan of treatment in any case of placenta previa. Basically every case of placenta previa must be considered as to the period of pregnancy. What one will do in placenta previa at five months or six months, one cannot do at term. Then the amount of blood lost tells something of the condition of the patient. Third, the condition of the cervix: a primiparous cervix presents a different condition to the



multiparous cervix. Again, the amount of dilatation of the cervix and the amount of effacement determine very materially what is to be done.

We have been treating with very good success our cases of partial placenta previa by waiting and vaginal packing, and the mortality has been reduced far below what we have had with bag introduction or bipolar version. Where there is an area of bleeding uterus alongside of the placenta, control of bleeding follows rupture of the membranes and firm packing and these patients will deliver spontaneously.

The next consideration is the presence or absence of sepsis. I agree that these cases die from rupture of the lower segment of the uterus, due to the trauma, shock and blood loss. Those that survive the sepsis, may die later from embolism.

We turned over all of the placenta previa cases in three services to one man some few years ago, and he did podalic version in every case (63) with two maternal deaths. That was the best record we have ever had and we have not been able to duplicate it.

I am thoroughly in accord with the doctor in regard to cesarean section in these cases of central placenta previa where there has not been a great amount of blood lost, where the patient is in good condition, and particularly in the primiparous cases or in the multiparous where the cervix is in good condition. Nothing is more alarming than the amount of bleeding that one can have in a central placenta previa with slight disturbances. This was brought home to me recently. I was called in consultation by one of my former students to see a case of placenta previa with twins. She had had her initial hemorrhage, had been in bed for several weeks and was being nursed along. She had another hemorrhage and he became frightened because her hemoglobin had dropped. The picture was typical of a twin pregnancy and the story was perfect. I looked very wise and said that she ought to be delivered and I would suggest delivering her from above in this particular case. He asked if I was not going to examine her and I said, "Well, it won't do much damage to slip a gloved finger in the rectum." I did it and I had a deluge. The point is that the history is the diagnostic point. Then, in the second place, never in a case of placenta previa make an examination unless you are prepared immediately to take care of your patient.

In the marginal cases that are in labor with an effaced cervix, the bleeding stops the moment labor pains stop. If we simply pack and let them alone we will be surprised to see how many of them will deliver spontaneously. But a cesarean section on a potentially infective case or on one that has been packed or on one that has lost a large amount of blood is dangerous. You should transfuse the patient and then section her, and it is surprising how the uterus contracts down and does not bleed after cesarean section. A few will have to have hysterectomy performed, but those are the few that are potentially infected.

DR. MILES F. PORTER, FORT WAYNE, IND.—I should like to emphasize the importance of deferring transfusions, infusions, etc., until after the possibility of a recurrence of the hemorrhage had been effectually overcome. To transfuse an individual with a ruptured uterus or something similar,—increasing the blood pressure before you have stopped the gate out of which the blood is flowing, is not under ordinary circumstances a logical procedure, and it is a dangerous one.

I would like to emphasize another point. It is not necessary to insist on a diagnosis prior to the institution of treatment. The death rate, for instance, in obstruction of the bowels remains about the same it has been for years, and 10 per cent of that death rate is due to delay, and practically all the delay is due to a desire to make a diagnosis. There is an acute lesion present, a woman likely to die of hemorrhage, and it does not make any difference whether the uterus has ruptured or not. The only thing is to give the proper treatment and

learn what you can after the cure has been made. All she wants is a cure and not a diagnosis.

I should like to corroborate what the last speaker said regarding the relative safety to both mother and child of cesarean section in these cases of placenta previa. So far as the child is concerned, there is no method any freer from danger and the mother's chances of getting well are more than ordinary. But you cannot prove this at the hands of any one man and we must apply that method of treatment that is best suited to the case we have on hand at the time.

DR. M. A. TATE, CINCINNATI, OHIO.—I desire to remind this Society that some twenty-four years ago the late Dr. Zinke read the first paper that was ever published on the treatment of central implantation of the placenta by cesarean section. At that time a terrific storm of criticism arose and no man was more abused for taking such a stand. Today the profession at large is almost unanimous that the best treatment when the placenta is centrally situated is a cesarean section.

DR. G. D. ROYSTON, St. LOUIS, Mo.—Central placenta cannot be diagnosed until there is advanced dilatation and if operation is done when the patient first begins to bleed, it will be done on many cases that might be controlled easily by packing.

I would like to ask Dr. Kellogg why they do the bipolar version, when we realize that the after-coming head is larger than the breech alone, and if we have one leg up alongside the breech we have in that case a larger dilatation, and by bringing down one leg we can control the hemorrhage satisfactorily and are less likely to injure the after-coming head than in cases where both legs are brought down?

DR. E. J. ILL, NEWARK, N. J.—The technic of reducing an acute inversion of the uterus seems relatively easy. I happen to have seen quite a few of these cases, the last two years ago. It occurred to me that the method I had long ago suggested for the reduction of an intussusception of the bowel might do to reduce the uterus. We know very well that in reducing a bowel we cannot pull at the end for if we do we tear the bowel, but if we put both hands beyond the tumor and keep on compressing the distal end of the intussuscepted bowel, reduction is made comparatively easy. The same holds true with the uterus.

The patient I wish to speak of had had several attempts made at reduction by a very competent obstetrician. He failed from below. I saw this woman on the twelfth day. I opened the abdomen and asked the doctor to push his hand up against the uterus so as to steady the organ. I introduced two fingers from above until they were beyond the constriction. Then one hand was placed behind the mass and the other in front and the fingers firmly brought together below the fundus so as to force the mass upward. That method has succeeded in every case where I have tried it. This woman had a baby since without any further difficulty.

DR. WILLIAM PFEIFFER, BROOKLYN, N. Y.—We should remind ourselves that after version or any other attempted method delivery should be spontaneous. It is the haste that tears the uterus, and the number of ruptured uteri with placenta previa should be very few.

DR. JAMES E. DAVIS, DETROIT, MICH.—I wish to speak of two cases. In one there was a small laceration just above the internal os which caused the death of a multiparous patient who was delivered in about six and a half hours without any accident whatever. In fact, she delivered herself, but she began to bleed immediately after the third stage was completed and continued to bleed, in spite of all efforts put forth to control the bleeding, for a period of about one and a half hours and then died. In this case the packing did not stop the hemorrhage because it did not reach the small area of laceration which was not more than 3 cm. long as shown at the autopsy.

The other case was one of complete inversion which I saw about eight years ago. The uterus was reinverted by manual manipulation and without any incident at all in the recovery. The patient had only a very slight degree of sepsis. The restoration of the tonicity of parts was good and in about two years patient had another baby without accident. The cause of the inversion in this case was due to two men pulling, one behind the other, in a brutal effort to deliver the child.

DR. RUCKER (closing).—There have been sixty-three cases of puerperal inversion reported since Evans' last paper about three years ago and it is interesting to note that if you divide those cases into group one, those that were delivered in the hospital; group two, those cases delivered in the home by physicians; and group three, those delivered by midwives, the mortality in group one is zero; 12.5 per cent in group two; and 36 per cent in group three. The whole question is the question of the prompt treatment of shock and if necessary, transfusion of blood.

There is one other factor, namely, the choice of anesthetic in these cases. Dr. de Gaudino, in South America is the only one I know of who has used novocaine spinal anesthesia for the reduction of the inversion. She had prepared her patient to do a Spinelli operation but under the spinal anesthesia, the cervix relaxed so much that she was able to manually reduce the inversion. Technically sacral anesthesia gives you the relaxation that is necessary, without the risk of an intradural injection.

In regard to Dr. Porter's suggestion, a premature separation of the placenta is a different proposition. You may get a prolapse of the separated placenta occasionally when the presenting part does not keep the placenta from prolapsing but usually prolapses are complications of placenta previa. A curious thing about it, is that when the placenta is normally implanted and prolapses, the cases reported have not given the classical symptoms of a premature separation of the placenta.

DR. KELLOGG (closing).—The inversion of the uterus cases as we have seen them in consultation were about thirty-six, forty-eight or seventy-two hours old. I am convinced from the cases that I have seen myself and from the experience of my colleagues that manual replacement of the uterus from below is only applicable to cases of inversion discovered immediately after delivery. I am equally convinced that the Spinelli and other cutting operations from below are only applicable to late cases weeks or months old of chronic inversion. I believe the operation of choice in the usual cases seen after some hours is to open the abdomen and replace the uterus by a procedure I have never seen described. This method is as follows: with an Allis clamp the inverted portion of the uterus and broad ligament in the neighborhood of the two is seized and firm traction made. This traction raises some of the inverted tissue with another clamp placed along the tube. The process is repeated and so on over and over again. At length one cornu of the uterus pops out and as it does so the other one slips out itself. This leaves the question of what to do with the uterus, and whether to lightly suspend it, let it alone, or do a hysterectomy on it since most of the cases run some temperature. I should like to have Dr. Polak's opinion on which of these three methods is the best.

Regarding the question of transfusion in placenta previa. In a certain number of cases a hemorrhage has to be stopped temporarily and the patient gotten into condition to deliver subsequently. In that case transfusion before complete control of the hemorrhage seems to be necessary.

As to the question regarding bipolar version, perhaps we used that term wrongly. We used it synonymously with Braxton Hicks' version. When there is two fingers' dilatation the foot is brought down and it is usually technically difficult enough to get one without trying to get two, and in addition the theory of

the treatment is that a half breech is a better tamponade against the placenta than would be the case if you brought down both feet.

Regarding spontaneous delivery in placenta previa, the fact is that there should be few deaths from ruptured uterus. I tried to emphasize in my paper that that is what we felt and we have made every effort to make these cases wait. But there is evidence from Johns Hopkins and in over 50 per cent of our own cases that as far as bags go you do not get full dilatation nor normal delivery. There is the added evidence that in a long series of cases the breech is so small in these premature babies particularly, that you do not get the necessary dilation for the head and the patients do not deliver themselves spontaneously. It is true that theoretically there should be few deaths from ruptured uterus but my discussion was that practically half the deaths resulted from that cause.

Regarding the diagnosis of a complete placenta previa not being possible until after some dilatation, practically every placenta previa that I have seen or that the records showed in this rather long series of cases, was admitted dilated two fingers and if you have nothing but placenta presenting with an actual two fingers' dilatation, it is safe enough to say that one is dealing with a complete placenta previa.

DR. PHANEUF (closing).—In answer to Dr. Rucker's question as to the inertia of the uterus, that may be a very much abused term, but it was said to be present in all of the cases which I looked up in the literature when preparing this material. Whether or not it was present in the case that I reported I do not know, as I was not present at the delivery but the attendant made a note in his record that it existed.

The question of anesthesia is necessarily a personal equation. The Europeans are much in favor of spinal anesthesia. I personally am afraid of this because in a period of ten years I have lost two cases of vaginoplastic operations and both died of cerebral hemorrhage following spinal anesthesia. All done under ether recovered. If spinal anesthesia will give enough relaxation to reinvert the uterus, it seems to me that ether anesthesia will do as much and in my opinion is less dangerous.

The question of transfusion was very important in this case. I feel that the woman would not have lived had she not been transfused shortly after the accident was discovered. She was in sufficiently good condition to stand the operation when she came to me, without further transfusion.

### Symposium on the Mechanics of Labor

**Indications for Cesarean Section**, by Dr. Budd Van Sweringen, Fort Wayne, Ind. (For original article, see p. 201.)

**The Occiput Posterior**, by Dr. Percy W. Toombs, Memphis, Tenn. (For original article, see p. 206.)

**The Relation of the Physiology and Mechanics to the Management of Labor**, by Dr. W. A. Fowler, Oklahoma City, Okla. (For original article, see p. 212.)

**Preparation and Treatment in Labor: Preparation of the External Genitalia for Labor, with Iodine-Alcohol. Report of 100 Cases so Treated, with Bacteriologic Results**, by Dr. Burnley Lankford, Norfolk, Va. (For original article, see p. 219.)

## DISCUSSION

DR. J. O. POLAK, BROOKLYN, N. Y.—In obstetric practise of today, I believe that there is no place for high forceps on account of the high fetal mortality that results from this method and which is uncontrollable.

With regard to widening the indications for cesarean section, I want again to stress the fact that there is a definite operative mortality from cesarean section, higher than from ordinary abdominal section. An operator may do a hundred abdominal sections, we shall say, for fibroid without the loss of one patient. One may even do six or seven hundred and have a mortality at the end of about 1.5 per cent. There is no one who can do a series of 200 or 300 cesarean sections who will not have a mortality of 3 or 4 per cent. There is a mortality that is absolutely uncontrollable. Consequently in widening the indications for cesarean section one must do so with a great deal of judicial thought.

I understood the Doctor to say that the majority of ruptures in the reported cases were in the lower section of the uterus. In all the statistics that I have ever studied they have been in the upper segment of the uterus. I agree that it is the position of the incision and the aseptic healing that determines the result. If one makes the incision in the median line low down in the uterus, rupture is less likely. DeLee told me only recently that in his experience rupture in the low operation in recurrence of pregnancy had never occurred. I know of no ruptures following the low operation. That rupture does occur in about 4 per cent of the cases where the high operation has been done there is no question.

Mention was made of operating on a patient by cesarean, who had previously had a drainage procedure on the supposition that adhesions would take place. A most amazing thing to all abdominal surgeons is to find that after a suppurative appendix where the abdomen is full of pus, if we simply incise the abdomen and put in a drain, and open the abdomen again years afterward, we will find no adhesions anywhere. It is the clean case that forms adhesions rather than the suppurative case.

About 75 per cent of all the cases of labor are posterior in the beginning, but rotate spontaneously in the vast majority of instances. They divide themselves into two classes. Those that engage will rotate and deliver if we give them time. In our recent analysis of 2,000 cases of occiput posterior, covering a period of something over ten years, 96 per cent of them rotated spontaneously; the incidence of forceps was 23 in a hundred; and the fetal mortality was 4.2 per cent. Now if that can be done by letting the case alone, favoring rotation by posture, giving the woman sufficient time, keeping up her resistance, giving morphine and scopolamine from time to time and employing forced nourishment, it seems to me that manipulation is unnecessary. I believe Potter has contributed something to the treatment of occiput posteriors that do not engage. If the pelvis is ample these are better handled by version, after the method of Potter. The real point in posterior occiputs is that we can do a great deal by posture. In my private practice I teach the patient to use the knee-chest position, beginning very early in pregnancy and continuing right straight through, as an exercise. And I have my nurse demonstrate to them just how they shall do it and she has them come in every two weeks to see whether they know how to do it, and we have found a surprising number of cases that have been occiputposterior rotate anteriorly in the course of the latter months of pregnancy as a result of routine knee-chest position. The lateral prone posture during labor, with the woman lying on the side toward which the occiput points, increases flexion and as soon as occiput gets into the brim of the pelvis it will take care of itself, if the patient has good pains. In the occiputposteriors that present and reach the pelvic floor as such, it is a conservative process, for nature has adjusted the head in that way with the biparturial diameter which is narrowest coming under the narrow pubic arch first.



These cases only occur in funnel pelves, hence it is better to deliver them as posteriors than to attempt to rotate them. We will have less laceration, at least that is my experience.

With regard to the preparation before labor, we have been testing out this alcohol-iodine method in one delivery room and mereurochrome in the other for a period of a year and a half and our morbidity is a little less in the mereurochrome cases, even when numerous vaginal examinations are made. I believe if we use soap and water alone we will get about as good results.

DR. ASA B. DAVIS, NEW YORK CITY.—During the past thirty-five years in the Out-Patient Department of the Lying-In Hospital we have confined something over 85 000 women. In that time very little change has taken place in the preparation for delivery. The external genitals and neighboring region are cleansed with green soap and water and then freely bathed with a solution of bichloride of mercury one to two thousand. Several years ago a number of our attending staff conceived the idea that bichloride or any other antiseptic used for this purpose could be dispensed with to advantage. The matter was taken up at a full staff meeting and discussed, and it was agreed to give this plan a trial for one month. Very soon it was noticed that minor sepsis and morbidity began to appear in our Out-Patient Department, and by the end of the trial month there was a unanimous vote that we should return to the use of bichloride solution. This has been continued up to the present time with good results. The Out-Patient Department rivals the In-Patient in the matter of morbidity and complications.

DR. G. D. ROYSTON, ST. LOUIS, MO.—I have found the occipitoposterior position in about 75 per cent of cases examined early in labor. Those that come down, with practically normal pelvic measurements, where the head stays in the mid-pelvis, are the ones that become difficult.

We have not found that posture made any difference, for sometimes they will rotate and sometimes they will not. The thing that we have found of most value in having them rotate satisfactorily is to have the head well flexed. If the small fontanelle is most dependent, it will rotate anteriorly and if it is not the most dependent part frequently the occiput will not rotate anteriorly. Rotating these heads with forceps is, I believe, a bad procedure.

DR. J. W. POUCHER, POUGHKEEPSIE, N. Y.—Speaking of the indications for cesarean section, I would like to give an experience with two cases. A young woman was sent from a country town into the hospital on account of a transverse presentation. After labor began, by rectal examination I made out a shoulder blade presentation and advised section, which the patient was prepared for, and upon higher incision, which I always make, I found a placenta presenting. I delivered the child and found a cord about three and a quarter inches long. Patient made a good recovery.

Several years ago I had another rather trying experience with the same sort of location, although in this case we had a normal presentation, normal pelvis, and a young patient. I was called in after the patient had been in labor several hours, on account of the condition of the mother. She was becoming weak and with every severe pain she was nearly collapsed. Of course, I advised delivering her immediately with forceps. Examination showed a head low down, on the first traction I made the patient collapsed, stopped breathing. I stopped, took off the forceps, resuscitated the mother, then put the forceps on again. There was a second collapse, and when the third collapse occurred I delivered the head and shoulders and still found there was something detaining delivery. At that time I made a diagnosis that the cord was short and thick, but I continued delivery until I got the cord down where I could put a clamp on, and then the delivery was easy. The mother



made a good recovery but the baby died the next day on account of some injury done through traction on the cord.

These cases seemed to warrant a diagnosis of short cord as the cause of a transverse presentation which persisted. Of course, not every case that does not have the head engage in the pelvis should indicate cesarean section, but I merely bring these two cases out in this discussion for a fine healthy baby was lost because we did not know what the indications were.

DR. EDWARD SPEIDEL, LOUISVILLE, KY.—In occipitoposterior cases, especially in multipara, we often find it of advantage, especially when the uterus is not exactly in the midline, to place the uterus in the midline and strap it there with adhesive plaster then using the postural method to favor rotation. I have preferred the position opposite to the one to which the occiput is directed; that is, in the right occipitoposterior the patient is placed upon the left side instead of the right. I had several instances only lately in which, while making preparations for a forceps delivery the patient was placed in this position and rotation occurred. In multipara, with a history of previous difficult labors, I often find an occipitoposterior position with a cervix fully dilated but thick and edematous and the occiput not descending. In such cases I put the patient under full anesthesia and deliver by version.

With regard to the diagnosis of occiput posterior, the fetal heart sounds are heard in the flank—the right flank in right occipitoposterior. They are also heard in this location for a left occipitoanterior, but the fetal heart sound of an occipitoanterior is never heard in the right flank.

As regards the preparation of the external genitalia for labor, we take the stand that the vulva should be shaved and not clipped. I am not very much in favor of either an iodine preparation or mereurochrome. Where not only the hand but the arm passes through the vulva, up to the top of the uterus,—I refer now to version—thorough cleansing with green soap irrigation, has been in my experience followed by little or no elevation of temperature and I believe consequently that such preparation is quite efficient. It is well known that in the antiseptic era we douched the vagina as a preparation for labor and then found that our morbidity increased, and in consequence we learned to let the vaginal tract entirely alone. What we may accomplish by painting the external genitalia with iodine, which is more or less irritating, or mereurochrome, I fail to see.

DR. WM. PFEIFFER, BROOKLYN, N. Y.—We know that most right-sided positions are posterior and if we make our abdominal examination thoroughly, we hardly need an examination through the pelvic outlet, rectal or vaginal, to confirm it. The only thing needed is to feel the location of the sagittal suture, and that can be easily done through very little dilation. If the fetus is on the right side the only conceivable positions are the O. P. or the R. O. A. or R. O. T. In other words, the bisacromial diameter and sagittal suture will remain at right angles, or nearly so, to each other.

In my own practice I have found that manual rotation is of some value at times; but I have used the opposite hand from that referred to. In the R. O. P. I use the right hand, and while you may have to get in an awkward position, you will succeed better. I think we must interfere sometimes in the interest of the baby, when the mother's condition doesn't call for it, but we have found out that cerebral hemorrhage in spontaneous deliveries is not an unheard of thing. If we wait too long we may lose some of the babies, or have a serious hemorrhage confront us.

DR. C. R. HANNAH, DALLAS, TEXAS.—I should like to emphasize one or two points. The weight of the mother is a factor in occipitoposterior position. The patient who is short, thick and fat frequently has as a complication occipitoposterior position. In such patients, we may experience trouble at delivery unless the weight

during pregnancy is controlled to not more than twelve or fifteen pounds above the standard weight. The prevention of an abnormal gain in weight during pregnancy is a prophylactic treatment for posterior position, and in those patients who have gained excessively in weight, posterior position should be considered as a possible occurrence at the time of delivery. In considering the size of the pelvis, we, at the same time, should consider the size of the fetus. The pelvis and fetus should be studied in relation to each other, and not separately as is frequently done. What is the difference between a large baby and a normal size pelvis, and a small baby and a contracted pelvis? Mechanically, they are about the same. Fetometry is as necessary as pelvimetry and should be studied and practised. If the fetus is diagnosed as excessive in size, then indication of labor should be considered, for we most frequently find occipitoposterior position complicating the delivery of the excessive size baby.

DR. EDWIN P. SLOAN, BLOOMINGTON, ILL.—Down in our part of the country three-fourths of the mortality from cesarean section is attributed to the fact that the physician in charge has delayed the operation beyond the time at which it should be performed because he is afraid of that particular operation. Now, Dr. Polak compared the mortality statistics of cesarean section with those of other abdominal sections which are usually elective operations, the good risk patient having been prepared for operation. I think that if he would compare his mortality rate with the mortality of emergency abdominal sections for other indications in patients who are as bad risks as patients usually are when they come to cesarean section, he would probably find that the mortality rate in those cases would be forty per cent against his only four per cent mortality in cesarean section.

The operation of cesarean section in itself is not very dangerous. The danger lies in the condition of the patient when brought to operation. In fact, the patients that I have known of, who have died, have been those who were operated upon while *in extremis* and either died on the table or within an hour. It seems to me that by stressing the danger of cesarean section we are increasing the mortality rate by delaying the operation, by encouraging doctors to wait and try everything else and then if they see that the patient is going to die within two or three hours, rush her to the hospital and have an attempt made by cesarean section to save her life. I am sure that in our part of the country it will save the lives of some mothers and babies if more stress is placed upon the early diagnosis of the necessity for cesarean section and less stress be placed upon the supposedly great danger of the operation itself.

DR. POLAK.—I said the mortality in cesarean section was about 3 per cent; that is, in the cases done early, the elective cases. If we take the late cases, the mortality will run from 14 to 20 per cent.

DR. EDWIN P. SLOAN, (continuing).—Answering Dr. Davis, I thought it would be obvious why these cases died so soon. The majority of cases that we see are apparently in almost a dying condition, and the cesarean section was done in an attempt to at least save the life of the baby. A great many of our cases are in shock, have puerperal eclampsia, etc., and are not brought in until it is apparent to the neighbors and the old women, and especially the minister, that the woman is going to die, and then they submit to cesarean section. A great deal of that delay is due to the fear for that particular operation that has been instilled in the average doctor in medical college. Nearly every student is made to believe that a cesarean section is the most awful and dangerous operation known and should be only attempted in emergencies. So these patients are often not brought in until it is apparent that the patient is going to die in a little while unless relieved.

The President's statement that babies delivered when the mother is in a dying condition usually do not live long should not deter us from the attempt

to save their lives. I know of eleven babies that have been delivered by cesarean section performed for the particular purpose of saving their lives, and they are all doing well.

DR. ASA B. DAVIS.—In the case of rupture of the uterus and repair subsequent to cesarean section we notice that most of these accidents occur because the patient does not appear in the hospital for, sometimes, many hours after labor has begun. If such patients had been followed up, admitted to the hospital and delivered by cesarean near term, or before the onset of labor, rupture of the uterus would not have occurred. Of late years we have found, in the Lying-In Hospital, a type of deformed pelvis which is giving us a good deal of trouble. The old time rachitic pelvic deformity is becoming rather rare and its place is being taken by a distinct type which is difficult to recognize at first. These women are usually short and thick set. The lumbosacral angle is well marked and the plane of the front part of the pelvis is unusually low. Pelvimetry discloses measurements up to or above the ordinary standards. The pelvic bones are thick and heavy, resembling the male pelvis. Not infrequently it is impossible to reach the promontory, and very often the internal diagonal conjugate is 12 or more cm. One such case came under my care reporting that she had habitually given birth to children weighing twelve pounds or over. All had been instrumental deliveries resulting in three stillbirths and two children who died within the first five days. I delivered her sixth child, weighing 12½ pounds, by cesarean section. It is well to do pelvimetry in every case, and to estimate the size and conformation of the pelvic cavity. At the same time we must remember that in this way we secure but one side of the equation. Almost invariably in this type of patient the fetus has large cranial bones, thick and heavy, the fontanelles and sutures are small and narrow, the head is block-like and does not mold readily. In such cases it frequently happens that the membranes rupture before the onset of labor and we are apt to find a posterior position. The vertex either entirely overrides the inlet and does not engage, or a segment setting in like a ball valve gives the appearance of beginning engagement. Dilatation is slow and the first stage does not progress. No matter what size the passage may be, we must take into account the size of the passenger who is to pass through it, as well as the "moldability" and possible adjustment of the fetal skull. We find that cesarean section is the safest way to deliver the majority of these cases. It is noticeable in obstetric practice that abnormalities appear to group themselves. This type of patient is evidently not readily recognized and I wish to call attention to it as a type. About two years ago, within a period of six weeks, I saw four of these cases in consultation. They had been allowed to go on in labor for many hours. There was no engagement. Tonic uterine contraction was well marked. This had not been deemed sufficient and pituitrin had been given. In one case the fetal heart had almost ceased. I believe all were delivered by craniotomy. At about this time I saw a fifth patient, a young healthy primipara who had been in labor for thirty-six hours. There was marked evidence of fetal distress and the pelvis was blocked by a fibroid tumor. These conditions should have been determined and prepared for before the onset of labor.

DR. SWERINGEN (closing).—I think the comparison which should be made is that between the mortality rate in cesarean section and the mortality rate in other operative procedures for the same pathologic conditions. They might be compared perhaps with those cases that need cesarean section but are delivered by other means. I don't believe the mortality rate would compare very unfavorably then, taking all classes together.

I have not done a high forceps operation for many years and I am very glad to know that there are so few of them being done.

I recognize, of course, that nature takes care of abdominal adhesions very frequently, but in the cases I reported, suppurative or gangrenous appendicitis took place at the sixth month of uterine gestation and very complete drainage had to be instituted. That suppurative process lasted about four or five weeks, which brought the gestation up to about seven months or within perhaps seven or eight weeks of her expected confinement. The surprising thing in that case was that the adhesions, which we knew were there, could be so well taken care of in the short time before labor began. We were firmly convinced that the uterus would not be able to free itself from the abdominal wall, and yet when we came to open the abdomen after the onset of labor we found that the adhesions, while numerous, were filmy and could be broken by the finger.

DR. TOOMBS (closing).—I tried to emphasize proper prenatal examination and to avoid as far as possible the application of forceps, particularly high forceps. I still believe, however, that after a patient has been in labor for some time, the membranes prematurely ruptured, the uterine wall and lower segment very thin, and the uterus tightly clasped upon the fetus, the high forceps operation, after the head is engaged, offers a far better prognosis, particularly for the mother, than does a podalic version.

DR. LANKFORD (closing).—I would like to say that there is no reason why green soap, which is the obstetrician's chief aid during the delivery (if you have to have an operative delivery), cannot be used after iodine-alcohol or mercurochrome is applied to the external genitalia. What we need is a clean field to work through and this is just simply an effort to find out whether or not iodine and alcohol do give you a clean field.

The patients are clipped rather than shaved for the reason that the shaving itself is an uncomfortable process and leaves a great many fine abrasions which will be still more uncomfortable after the iodine is applied. The patient's convalescence is much more comfortable if she has not been shaved.

DR. ROBERT D. MUSSEY, Rochester Minn., read a paper entitled **Observations on the Treatment of Edema of Pregnancy Toxemia with Ammonium Chloride.** (For original article, see page 222.)

DR. LEE DORSETT, St. Louis, Mo., read a paper on **Magnesium Sulphate in Eclampsia.** (For original article, see page 227.)

#### DISCUSSION

DR. C. R. HANNAH, DALLAS, TEXAS.—May I ask Dr. Mussey if he considers a standard weight for his patients? Does he consider the gain in weight determined from a standard weight, or from the usual weight of the patient? The standard weight of the patient should be the basis for a gain during pregnancy. I believe that the resistance to toxemia and infection is greater in the patient where the gain in weight has not been more than twelve or fifteen pounds above her standard weight. May I ask Dr. Mussey what is the amount of diet his patients receive when he places them in the hospital for the treatment of edema of pregnancy toxemia, and, also, were they gaining in weight previous to their entrance to the hospital?

DR. MUSSEY (closing).—Dr. Hannah has brought up the question of diet. Some of these patients had been under our care prior to the time they came into the hospital, but we saw many of them for the first time when they presented themselves on account of the toxemia. Those whom we had been seeing had been on

a diet which would keep the patient within normal limits of weight gain, and in most instances the excessive gain in weight was due to increased retention of fluid in the tissues rather than from excessive food intake. In the treatment of the hospitalized patient, 1,500 calories of food were allowed daily.

DR. JAMES E. DAVIS, DETROIT, MICH.—May I ask Dr. Dorsett, in closing, if he will give an explanation if possible for the action of magnesium sulphate?

DR. DORSETT (closing).—I did not go into the details in regard to the action of the drug, because that has been worked out so well by other men before this paper was written, but briefly it has a marked effect upon the central nervous system as a depressor, producing relaxation, varying, of course, in the way it is given. It has no effect upon the uterine contractions, but we use the larger dose because we give it intramuscularly. Those who are using it in brain surgery are getting the same result, a marked diminution in intracranial pressure. I am sure we obtain as much relief from the cerebral edema as we do from the general relaxation of the patient.

As far as the diuretic effect is concerned, I am confident that it has some effect upon the excretion of the kidneys. I am also sure that it has some effect upon the general edema.

**Prevention of Stillbirths**, by Dr. C. R. Hannah, Dallas, Texas. (For original article, see page 231.)

#### DISCUSSION

DR. EDWARD SPEIDEL, LOUISVILLE, KY.—The mental attitude of the mother in pregnancy may be considered a very important factor in the well-being of the developing fetus and I have of late paid especial attention to this feature. Patients are often frightened by the gruesome tales of the terrible things that occur to the pregnant woman,—the maternal impressions and malformations that may occur during pregnancy. I try to create a proper mental attitude in my patients by informing them that after the fetus has once formed nothing can change or alter this condition, consequently they cannot be influenced by any such mental impressions. However, I have taken this attitude—and I believe it is the correct one—that the mental condition of the mother during the time she carries the fetus undoubtedly influences the disposition of the unborn child and that it is their duty as mothers to be in the best possible mental condition during the period of gestation, and in that way I generally find that I have happy, friendly, well disposed patients in my charge.

With regard to the cause of stillbirths, there is one feature in the paper that I think is most worthy of discussion, and that is the deaths due to cerebral hemorrhage. We are told that infant deaths from cerebral hemorrhage can easily occur in ordinary vertex presentations in consequence of the continual pounding of the presenting head on the perineum. We are told again that in conditions of moderate pelvic contraction, when the child cannot be born head first, that by reversing the position of the child, bringing the pole of the chin into the superior straight, as is the case in breech presentation, a delivery can often be effected. But now we are told that cerebral hemorrhage is more frequent in breech presentations than in vertex presentations. I challenge that statement, not because of what is found in autopsies, but I believe that the greater frequency of cerebral hemorrhage in breech presentations over head presentations is because of the improper conduct of breech presentations that is still practiced. We all remember, and we have all taught that if the head is not born within eight minutes after the presentation of the umbilicus that the child will die and in consequence we hasten that part of the delivery.



Then again many of us have taught the method of delivery of the after-coming head which consists in inserting two fingers of the left hand in the mouth, the index and middle finger of the right hand across the neck of the child, making pressure downward and bringing out the head in that manner. That method of delivery is absolutely wrong and is largely responsible for the injuries and the death of the baby in the delivery of breech presentations.

The method of delivering the head by suprapubic pressure as brought out by Potter results in very little injury to the fetus and I believe that when properly done that many children can be saved and the incidence of stillbirths lessened by converting a head into a breech presentation and delivering by the method outlined.

DR. JAMES E. DAVIS, DETROIT, MICH.—There is one feature in connection with this discussion that the essayist has not spoken of in any direct way, namely the eugenic control. I am reminded of some work that has been done by the Government Officials in tracing what has been termed the Martin Kallikak family.

A man married or had mated with a half-witted woman and as a result of that mating there were about 480 descendants. The second mating was with an intelligent woman and from that union there were some 490 descendants. From the first mating there were only about two of the entire group that proved to be very useful citizens or who became in any way distinguished. Of the other group, a very large percentage became exceedingly useful in many ways, some of them being signers of the Declaration of Independence, some members of the Supreme Court; a large number were professional men.

The Government spends, I believe, .33 of a dollar in the culture of the human race, specifically speaking. For the culture of lower animals, a much higher amount is expended. For the protection of vegetable life a still larger percentage of money is expended. If we could by a process of education, as our president has said, strongly emphasize the work in connection with this subject and carry it into the field of eugenics, getting the cooperation of all concerned, it would mean very much in the way of improving the records we have in this particular.

One other point: It has been my observation, not only when I was in obstetric practice but since I have been in pathologic work, that when a baby is lost very little attention is given to a study of that case. The study ends in most instances when the baby dies. Each case, I believe, should have an exhaustive study and a most careful record made of the mother and of the family, and also of the placenta. If the child dies, a careful pathologic study could be made of the body. If the child does not die, but is a weakling, a very careful study could be made of the placenta and a careful history kept of the child. This should be kept as an accurate permanent record and it would do much, I am sure, towards helping when the next problem has to be met.

DR. JOHN O. POLAK, BROOKLYN, N. Y.—I unfortunately did not hear whether the Doctor had any way to prevent that large percentage of stillbirths that we class as macerates. They seem to be the ones that add about 1 per cent to 1.7 per cent to our stillbirth mortality.

In the North we don't meet syphilis quite as frequently as down South. Following this along in a prenatal clinic for a number of years our 4-plus Wassermanns ran less than 3 per cent and our 3 and 4-plus ran about 6 per cent. History has no significance at all. We cannot tell syphilis by the history. We must have repeated Wassermanns and study the placenta and the fetus. We have found even beginning in the last weeks of pregnancy that the antisiphilitic treatment will give some results, and women who have repeatedly given birth to stillbirths have been delivered of living children when the treatment has been begun in the last few weeks of pregnancy.



As to the statement regarding induction of labor in contracted pelvis or overgrown fetus, I want to take a stand against that and say that neither you nor I nor any other living man can tell accurately how large the baby is, nor how many weeks old it is. Our experience has been in letting these cases alone that we have had the most remarkable surprises, and almost all obstetricians have had that same experience. In other words, you don't know within two or three weeks the exact length of pregnancy whether you use Reed's method or any other method, and children that you think are overgrown often surprise you by being relatively small; and those that you think are small, will be large. I have repeatedly put my hand on the head and made measurements of the head and thought it was a small baby and then been surprised to find an  $8\frac{1}{2}$  or 9 pound child come through. Again we find that 81 per cent come through spontaneously in these relatively contracted pelvises, and if that is so they are entitled to the test of labor and a clean section rather than add to the 54 per cent that result in operative necessity.

Another point I want to call attention to which has prevented more stillbirths perhaps than anything else, and that is listening to the fetal heart during each pain in the second stage. We have saved more babies by delivery by episiotomy or by low forceps or by expression as a result of the index that has been given by the fetal heart slowing or becoming irregular than anything else we have to offer in the prevention of fetal mortality.

DR. BURNLEY LANKFORD, NORFOLK, VA.—I would like to get the opinion of some of the other members about the conversion of breech into cephalic presentation. If the fetus is easy to get into the cephalic position, the next time the mother comes back, it has gotten into the breech again, and if they are difficult to convert it is safer to let them alone, because you do not know what the position of the cord may be and what the reason may be for the breech presentation.

I was particularly glad to hear Dr. Hannah mention the avoidance of haste after the head is delivered. As soon as the baby's head is born unless there is some emergency, it is much safer for the child to allow the woman to deliver herself by the force from behind.

About the question of the postmature or relatively oversized child, I should like to hear the experience of some of the members on that point. Does any one know of any accurate experimental work on the possibility of influencing the size of the child by the mother's diet? I believe that is still a mooted question and personally I don't believe that much can be done by that method. It seems to me that the point brought out that the fetus is a parasite and will get what it needs for its growth from the mother, no matter what the mother's condition, is nearer the truth, rather than the fact that starving the mother will starve the baby.

A patient was ill during the latter three or four months of pregnancy. She had nausea, anemia and general arthritis and a number of other complaints, and was practically skin and bones, but she came along with one of the most beautifully developed fetuses I ever saw. I know that she got almost no food during the last three months.

DR. GORDON K. DICKINSON, JERSEY CITY, N. J.—The after result is not merely whether the mother or child recovers, but it is the mentality of that person later in life. We know that first children are prone not to be quite so clever and quick as the children who come afterward in a large family, and to get competent obstetrics I believe we should think in terms not of morbidity or mortality of the mother and child, but of the future usefulness of the coming brain.

DR. FOSTER S. KELLOGG, BOSTON, MASS.—I would like to say that we have given up external version in the out-patient department because I believe that we lost some babies from separated placenta.

I would like to ask what is meant by "studying the fetal heart during pain"? Under just exactly what circumstances is interference justified?

DR. WM. A. FOWLER, OKLAHOMA CITY, OKLA.—Dr. Kellogg's statement is interesting. I have recognized the possibility of harm from external version. I would like to know if there have been other disasters reported from external version. I have always done this when possible. Very rarely have I been unable to turn a child from breech to vertex and I have never had harm result from it. I always use a good deal of gentleness and if there is much tonicity of the uterus I wait a day or two to do the turning. I have rarely had a case turn back to a breech presentation.

Our mortality statistics are usually compiled from the clinical service and we all know the great disadvantage of those statistics. Clinical cases do not give us nearly the good results that our private cases do. At the Oklahoma Lying-In Hospital, including all cases, even those that come in with dead fetus, our fetal mortality has been less than 4 per cent. They are all private cases. Among my own patients, eliminating the out of town cases and those that did not receive prenatal care, the fetal mortality has been 1 per cent. I think prenatal care offers our greatest opportunity to conserve fetal and maternal life and health.

DR. HANNAH (closing).—Postmortems are valuable and should be held on all stillbirths. The pathologist can better diagnose syphilis by the study of the different sections of the organs, and it is often difficult to make a diagnosis of syphilis without this report. The statistics which I quoted relative to the cause of stillbirths from the cephalic and breech presentations were those of Francis J. Browne, of Edinburgh, and were based upon postmortems. I believe in converting the breech into cephalic presentations when indicated, but judgment must be used in this procedure. Quite frequently, this can be done with ease near the termination of pregnancy, but should we wait until the onset of labor, the results may not be as satisfactory. This position may be maintained by the use of an abdominal binder. I favor cephalic to that of the breech presentations in delivery because there is greater injury to the brain in the after-coming head, and statistics will probably bear me out that in the breech the mortality of the fetus is greater than in the cephalic. Breech deliveries are not physiologic, but have their place, and should not be used where the cephalic is indicated. The obstetrician should use that method which removes the hazard of injury to the fetus and the mother. I believe in the teaching of Reed, that by exercising ordinary care and judgment, the physician may diagnose postmaturity, or the excessive size fetus. I cannot bring myself to the belief that the excessive size fetus, weighing ten or twelve pounds should remain *in utero*. Why should not labor be induced before the fetus becomes excessive in size? It is the business of the obstetrician to diagnose the maturity and postmaturity of the fetus. This is not so difficult. I find that medical students and internes manifest greater interest in the mechanism of labor, and are more alert for the welfare of the fetus from the study of maturity and postmaturity of the fetus, and this knowledge assists in the prevention of stillbirths. If fetometry confirms a fetus of excessive size, nine, ten or twelve pounds, and the date of confinement, calculated from last menstruation and quickening, has been determined, induction of labor may be considered within a few days after the date of expected confinement. By practical experience, I find that more injuries occur to the excessive size fetus during delivery than in the smaller, matured fetus. I know that the premature fetus cannot endure shock and traumatism as the matured fetus. We should avoid the two extremes, prematurity and postmaturity, and deliver the mature fetus rather than the premature or excessive size fetus. The greatest advancement during the next few years in obstetrics will be in the prophylaxis and prevention of injuries and death to the newly born.

DR. ASA B. DAVIS, NEW YORK CITY.—I take issue with the statement as to induction of labor in overterm pregnancies. I do not agree with the teaching that there are many overdue children, necessitating induction of labor, or that we have arrived at a time when it is possible to determine the size of the unborn child, or the duration of pregnancy with sufficient accuracy, to make it of use. While it is undoubtedly true that in the lower animals, and in the human race, pregnancy sometimes does continue considerably beyond the usual time allotted for full term gestation, and that the fetus develops with increasing rapidity in such cases, in my experience this is an infrequent occurrence. We should remember that the last few weeks of uterogestation are very important, especially in the development of the cardiovascular system of the fetus. I am well aware that a great many obstetricians are frequently and habitually finding large and overdue children, and are using this as an excuse for induction of labor at a time convenient to themselves and the patient. Undoubtedly in many instances this procedure is carried out satisfactorily, but, just as certainly in some cases it causes unnecessary trouble and danger to the mother and child.

**Report of a Case of Mesenteric Cyst, by Dr. Edmund D. Clark, Indianapolis, Ind. (For original article, see p. 238.)**

#### DISCUSSION

DR. HENRY SCHMITZ, CHICAGO, ILL.—Dr. Clark stated that radiation was given because malignancy was suspected. This is an instance where radiation was applied without making a diagnosis and consequently success could not result,—not due to the radiation therapy but due to the lack of a diagnosis. I feel that a positive diagnosis should always be made before treating any disease. This would have necessitated an exploratory laparotomy and tissue could be removed for microscopic diagnosis. Only then would it be possible to decide correctly whether radiations are indicated.

DR. JAMES E. DAVIS, DETROIT, MICH.—Here is a case where the diagnosis should be made *in situ* from the gross characteristics. The microscopic diagnosis in a case of this kind is practically useless, and any one who has had practical experience will bear me out in this statement. Whether you have or have not an endothelial lining or fat cells lining the cyst, you cannot make the diagnosis if it is detached from the tissue which held it. So the clinician should make the diagnosis by the most careful observation as to the mobility, as to the attachment, and then if he wants to consult the laboratory findings as to type of the lining, all well and good, but that will not add very much to the substantial diagnosis of this kind of a case. It is practically useless to send a specimen of this kind to the laboratory without any data, and expect the laboratorian to make a diagnosis.

DR. O. G. PFAFF, INDIANAPOLIS, IND.—I reported two cases of mesenteric cysts several years ago, one at our New York meeting and one at the St. Louis meeting, and have since that time had two more. When I found the first two I thought they were very rare, as they evidently are. However, I felt when I went over the literature, and especially when I found my second case, that there must be a good many more of these cases than come to the surface.

In one case I found very definitely the graphic description applied to the mobility of these tumors. This tumor appeared in the upper left side, was about as big as an orange, could be moved to the other side of the abdominal cavity, and once in a while it would drop far down into the pelvis. I think that explains the phenomenon found in a great many of these cases where the tumor has suddenly appeared. The patient may have gone along without any history and suddenly,

perhaps following a fall from a street car or down a stairs, a tumor appeared in the lower abdomen. It may have been lying in the pelvis for years and was not discovered until displaced into the abdominal cavity.

I drained two of the four cases, and enucleated one. The last one was in a very young girl, about six years of age, who had had attacks of indigestion all her life, quite marked right sided pain and a good deal of nausea and vomiting. Suddenly she had an acute attack of obstruction of the bowels, with some temperature and signs of a tumor in the right side. A diagnosis of acute appendicitis was made and at operation we found a cyst involving the mesentery of the ileum which had dragged the ileum down and produced an absolute obstruction. We had to make a resection of about six inches of bowel and the child got well.

DR. CLARK (closing).—I think Dr. Schmitz' criticism of my treatment is a just one. The x-ray was not used with the idea of curing the patient, but with the hope that the discomfort and pain might be relieved. Inasmuch as the patient absolutely refused surgery, there was some justification in using the x-ray.

*(To be continued in the March issue.)*

# Department of Reviews and Abstracts

CONDUCTED BY HUGO EHRENFEST, M.D., ASSOCIATE EDITOR

## Collective Review

### THE RELATION OF THE ENDOCRINE SYSTEM TO PREGNANCY\*

#### A SUMMARY OF RECENT VIEWS

BY AARON CAPPER, M.D., PHILADELPHIA, PA.

(From the Department of Obstetrics, Jefferson Medical College)

THE purpose of this paper is to correlate certain of the phenomena of normal pregnancy with their relationship to the secretions of the ductless glands. We wish to indicate how some of the disturbances that may complicate pregnancy are either directly or indirectly dependent upon dysfunction of one or more of these glands. The great part of the science of endocrinology rests on speculation. The definitely established and proved facts concerning the action of these glands are few in number. It is only during the last few decades that the great importance of these structures on human economy is realized.

We are acquainted with the malformations that result when a baby is born with a maldeveloped thyroid gland, and of the astounding results that follow the administration of the extract of this gland. The parathyroid glands are each about the size of a pea; when three of them are removed nothing happens; when the fourth is removed there follow twitchings, spasms, paralysis, dyspnea and death. Cushing<sup>17</sup> has demonstrated that no ill effects follow the extirpation of part of the anterior lobe of the pituitary gland (a gland only a few grams in weight) but its complete removal causes death. (More recent investigation attributes the death coincident with the removal of the pituitary gland to injury of the hypothalamus.) The romance of the glands of internal secretion and their relationship to human economy is in its very incipency. We are cognizant of the possibilities that are forever present in that domain. With keen expectation one looks forward to the developments that the future holds in store regarding the ductless glands. The scientific, and particularly the medical, world is still vibrating to the chords of joy which the fingers of Banting and his coworkers struck. Who can foretell what tomorrow may bring?

#### THE FETUS AND ITS DUCTLESS GLAND SYSTEM

In order to determine the relations of internal secretions to pregnancy, it becomes necessary first to decide whether the ductless glands of the fetus itself have any influence on pregnancy. If the fetus

\*Read before the E. P. Davis Obstetrical Society, Jefferson Medical College, Philadelphia, Pa.

elaborates internal secretions, we must ascertain whether and to what extent they, in addition to the maternal secretions, affect the course of pregnancy.

Some authors maintain that the internal secretions of the fetus itself play no part in its development and in the progress of pregnancy, and that the fetal glands of internal secretion have hardly any function during intrauterine life. Others claim that the secretions exert some influence by their admixture to the maternal blood. A little contemplation, however, will soon convince one that the internal secretory glands of the fetus are likely to wield a very powerful effect. A marked hyperemia is found in the thyroid glands of fetuses. The mammary glands of newborn boys and girls contain colostrum. The prostates of newborn boys exhibit some hyperplasia, and the uteri of newborn girls often show distinct hemorrhage. But, even if we were unaware of these findings, we could suppose that those organs which throughout life influence growth and development, would naturally function to their utmost during the period of most marked growth activity. We thus can conclude, that the fetal internal secretory glands begin to function during intrauterine life; that not only do they have a decided influence on the growth and development of the fetus *per se*, but that the fetal internal secretions probably pass into the maternal blood; that they are added to the maternal endocrine secretions and thus simulate a hyperactivity of the maternal glands of internal secretions.

We shall now take up the individual glands, point out their influence on pregnancy, and wherever possible mention the experimental evidence upon which the statements are based.

#### THE PLACENTA

That the placenta must be considered a gland of internal secretion is now almost universally accepted. The pregnancy-hyperplasia of the breasts in the mother and fetus is said to be produced by a specific hormone or ferment which proceeds from the chorionic epithelium of the placenta. Halban<sup>3</sup> proved this by a remarkable observation. He noticed that the breasts in a pregnant woman go on developing and enlarging even if the fetus had been dead a long time if the placenta remained alive. When, however, the placenta also died, the further development of the mammary glands ceased and milk began to flow. Halban thus concluded that since the onflow of milk always coincides with the removal or death of the placenta, and is enhanced by extirpation of the ovaries, the placenta and ovaries induce the growth but inhibit the secretion of the mammary glands.

Starling and Lane-Claypon<sup>14</sup> have regarded the fetus as the source of the mammary gland hormone. Actually, they even succeeded in inducing growth of the mammary glands by the injection of embryonal extracts into the peritoneal cavity of rabbits that had not yet been impregnated. This fact, it seems to us, does not conflict with Halban's views, for it is quite likely that the placental hormones are present in the tissues of the fetus. As just mentioned, also, the enlargement of the newborn's breasts is ascribed to this hormone.

C. M. Stimson<sup>20</sup> claims that the placental extract or hormone is not a galactagogue, and that as long as the placental hormone is in the maternal circulation, it exercises an inhibitory effect on mammary



secretion. These observations coincide with and are confirmed by the experimental results of O. Frankl<sup>21</sup> on pregnant mice.

That the ovaries are not necessary for the pregnancy-hyperplasia of the mammae was proved when, in spite of castration undertaken in the early stages of pregnancy, the development of the breasts proceeded in a normal manner, and the women were able to suckle their children. In fact, it seems that removal of the ovary later exercises favorable influences on milk-production, as breeders state that castrated cows yield abundant milk.

We, therefore, infer that the enlargement of the breasts in pregnancy is chiefly the result of hormone activity, especially of placental hormones, and that secretion of milk is induced by the removal of the placenta and is enhanced by extirpation of the ovaries.

#### THE OVARIES

The internal secretion of the ovary is elaborated in the corpus luteum. This was demonstrated by the ingenious experiments of Frankl, in 1910 and in 1923.<sup>21</sup> The functions of this secretion, as stated by Frankl, consist in a regulation of the blood-supply, of the formation of the decidua, and the implantation of the ovum. The cessation of ovulation is also ascribed to the persistence of the corpus luteum. Frankl found that when he destroyed the corpus luteum in a woman by means of a cautery, the next succeeding menstrual period failed to occur.

In the later months of pregnancy, it is the "interstitial glands" or theca cells which exert the chief ovarian influence on pregnancy. These cells in turn are stimulated to internal secretion by the products of the placental villi. This so-called "interstitial gland" consists of the hypertrophic theca cells which develop about the periphery of follicles which are undergoing atresia. These cells are particularly well developed during pregnancy. It is believed that these transient structures give rise to an internal ovarian secretion. It is quite probable, however, that the secretion of these theca cells is closely related to that produced by the corpus luteum.

That the development of the fetus subsequent to the implantation of the ovum is not dependent upon the corpus luteum was shown by Kleinhaus and Schenk.<sup>8</sup> They extirpated the corpus luteum and pregnancy was not interrupted.

In concluding the discussion of the relationship of the ovarian internal secretion to pregnancy, we shall quote the words of Falta,<sup>13</sup> a recognized authority on the problems involved in internal secretion. He says: "Surveying now the alterations described, which take place in the organism of pregnant women, we find that they are entirely analogous to those which occur in the premenstrual period, while, however, the phenomena of the premenstrual period proceed from the ovary, there can be no doubt at all that the similar, but potentized, manifestations of pregnancy proceed from the developed egg. It, therefore, seems to us that the conclusion lies at hand that all the manifestations of the premenstrual period are set free by the maturing follicle, which only renders intelligible the fact, that the extirpation of the ovaries during pregnancy has no influence on this phenomenon, as the maturing ovum no longer is found in the ovary, but in the uterus."

No definite evidence exists at the present time as to the etiologic relationship between corpus luteum secretions and hyperemesis gravidarum, although there have been a few cases reported that improved under the administration of the extract.

Granted that one of the functions of the corpus luteum is the imbedding and safe walling-in of the ovum after it has been fertilized, the question arises whether in women who habitually abort, we may not be able to demonstrate certain irregularities in the corpus luteum formation.

A very valuable contribution to this subject has been recently published by Allen, Pratt, and Doisy.<sup>24</sup> These investigators succeeded in extracting a lipid hormone from ovarian follicular cysts, the corpus luteum, normal ovarian follicles, the corpus luteum of pregnancy, the human placenta, and from embryonic tissues. The authors conclude that "the corpus luteum can be excised as early as twenty days following the last menstruation without interfering with normal gestation; consequently, this endocrine function of the corpus luteum in woman during this time does not seem a necessary one."

Regarding the endocrine function of the placenta, the above mentioned authors say: "It is rather difficult to see how such large quantities of active substance (lipoid extracts of the placenta which seem to possess the same potency as the ovarian follicular hormone) could be retained in such a vascular organ as the placenta without passing freely into the maternal circulation. Since it is so well established that development of the follicles is seriously inhibited during pregnancy, it would seem to us more probable that the human placenta takes over from the ovaries the major part of the function of the secretion of this hormone, thus maintaining the maximal function of the genital tract, and initiating growth in the mammary glands during gestation. The increased amounts of this hormone in the maternal organism would seem a logical cause of the hypertrophy of other endocrine organs during pregnancy. Whether this function is borne by the embryonic tissue of the placenta or by both maternal and embryonic parts acting as a unit, is still to be determined."

#### THE EPIPHYSIS (PINEAL GLAND)

We must refrain from a discussion of the importance of the pineal body, because our knowledge concerning its function and especially its relation to pregnancy is practically nil.

#### THE PANCREAS (ISLANDS OF LANGERHANS)

Not much had been known, heretofore, concerning the internal secretion of the pancreas and, therefore, concerning its relation to pregnancy. With the advent of insulin and our increased information concerning the activity of the cells of Langerhans, we may hope in the future to learn more about their specific rôle during pregnancy.

#### THE THYMUS GLAND

The thymus gland ordinarily atrophies with the approach of puberty and, therefore, does not often exert any influence upon pregnancy. Bompiari, however, has shown that in cases of abnormal persistence of the organ it undergoes diminution in size during pregnancy and

enlarges again after delivery. Its physiologic atrophy is generally ascribed to an inhibitory effect of the ovary on the thymus.

The persistence of the thymus may also give rise to a picture simulating Basedow's disease. More likely, however, this is the result of actual hyperthyroidism, for it is now recognized that in most cases of enlarged thyroid there also exists an accompanying hyperplastic thymus gland.

#### THE THYROID GLAND

The fact that the thyroid gland is enlarged during pregnancy, was known even in antiquity. There is no doubt that this increased volume is associated with an increased function.

Lang,<sup>1</sup> in a series of 133 cases of pregnancy, found the thyroid enlarged in 108, the organ beginning to enlarge definitely about the fifth month. The increase ceased, however, if thyroid extract was administered, and began again when the extract was withdrawn.

H. W. Freund, in 1882, first made a systematic study of the thyroid gland in pregnancy. It is enlarged in 65 to 90 per cent of the cases, and gradually diminishes in the latter part of the puerperal period. The enlargement is due to a hypertrophy and hyperplasia of the tissues. The changes in the glandular epithelium and the marked increase of fresh colloid point to an increased secretory activity of the organ.

It appears that the thyroid gland is influenced greatly by the activity of the sexual organs. During puberty and during the menstrual period it is the ovarian secretion, and during pregnancy it is the placental materials which lead to a hypertrophy of the gland.

In some pregnant patients definite evidence of hyperthyroidism exists, such as marked nervousness, irritability, emotionalism, tachycardia, tremors and an enlarged thyroid gland. Daly and Strouse<sup>23</sup> studied twenty-five cases of this sort. They treated them with no other medication than three to five drops of Lugol's solution, three times a day, and all the patients became free from symptoms, usually within seventy-two hours.

Some authors are inclined to attribute the phenomena of eclampsia, hyperemesis and puerperal psychoses to a thyrogenous influence, but there is, as yet, no experimental evidence to support this claim.

The reason for the thyroid gland hypertrophy during pregnancy evidently is the demand for increased metabolic activity required by the hypertrophy of maternal tissues and the additional life within the uterus.

#### THE PARATHYROID GLANDS

These glands undergo considerable hypertrophy during pregnancy, and their secretion apparently is essential to a normal progress of gestation. To a great extent they act through the calcium metabolism.

The typical parturient tetany is a rare malady. Studies upon cases that have come to autopsy, and animal experiments go to show that the tetany occurring during pregnancy results from an insufficiency of the parathyroids.

Pregnancy makes increased demands on the parathyroids, a fact quite obvious from the increased amount of calcium to be metabolized for deposit in the fetus. Quite often are found disturbances of other endocrine glands in cases of tetany of pregnancy.

The tetany of pregnancy is a particularly severe form of tetany on account of the involvement of the respiratory muscles. Published results show that 7 per cent of patients died during this affection, even though pregnancy was terminated.

Vassale, Pepere, and Zanfognini showed lesions of these organs after death from eclampsia. They also showed that experimental parathyroid insufficiency beginning during the last three months of pregnancy caused grave eclampsia. In two of the three dogs in which the parathyroids had been removed, Vassale was able to prevent eclampsia by giving large doses of parathyroid extract orally.

In a recent editorial in the *Journal of the American Medical Association*<sup>22</sup> we read: "Dragstedt and his coworkers at the Northwestern University Medical School have indicated the close relationship between eclampsia and the toxemia occurring during pregnancy in the parathyroidectomized dog. Both in the latter and in man there is evidence for the existence of a toxemia arising from the pregnant uterus and caused by toxic protein derivatives. Both diseases are characterized by the appearance of tonic and clonic convulsions, usually during the latter part of pregnancy or immediately after delivery. Both disorders are relieved by emptying the uterus. Some critics might aver that it is a far cry from parathyroid tetany to eclampsia, but the Northwestern University physiologists have found that in the dog, through removal of the parathyroids, a toxemia develops that most often produces tetany but which may in many cases cause profound depression, a gradual cachexia associated with anorexia and diarrhea, or a marked ataxia and stupor without tetany. It is, therefore, not logical, they add, to say that eclampsia does not represent a functional parathyroid deficiency simply because it is possible to differentiate by clinical signs, eclampsia from tetany. A relative or absolute parathyroid deficiency in the dog renders it liable to toxemia during pregnancy, which usually manifests itself as tetany but may produce other nervous or constitutional symptoms."

The treatment of parathyroid insufficiency, aside from the general and symptomatic management, consists in the administration of parathyroidin and calcium salts.

#### THE HYPOPHYSIS (PITUITARY GLAND)

The hypophysis undergoes a marked hypertrophy during pregnancy. Its weight can rise to two and a half times as much as normal. Enlargement of the anterior lobe is exclusively responsible for this increase in weight. The anterior lobe becomes more juicy, softer, and heavier. This enlargement is chiefly due to an increase in the number and size of the "chief cells," and their ultimate transformation into the so-called "pregnancy cells." In the later stages of pregnancy more than four-fifths of the organ may consist of the newly-formed cells.

It was L. Comte, Moulon and Launois who first pointed out this enlargement of the pituitary. Launois and Moulon<sup>5</sup> confirmed this in two instances, one of the parturients having died from eclampsia. They found a marked increase of the cellular elements. In a more recent work, Launois reiterates his previous conclusion that in pregnancy the anterior lobe is in a state of marked "hyperactivity."

Cushing<sup>17</sup> has found that repeated pregnancies may so enlarge the

pituitary gland as to cause transient bitemporal hemianopsia due to pressure of the gland on the optic commissure. Enlargement of the pituitary gland before or during menstruation, or a disturbed secretion, may frequently be the cause of the so-called menstrual headaches.

Enlargement of the hypophysis during pregnancy is sometimes so considerable as to give rise to cerebral manifestations. In rare cases even a pressure action on the chiasma seems to be possible. V. Reuss<sup>16</sup> described repeated temporary blindness during pregnancy, while Bellinzona and Tritondani reported bilateral narrowing of the visual field. Certain manifestations point to an increased hypophyseal function during pregnancy, such as increased growth of the pelvis and osteophytic formations on the internal surface of the skull. Tandler and Grosz<sup>15</sup> emphasize that in gravid women there is a coarseness of the facial features, especially of the soft parts of the nose and lips, and moreover, that a thickening of the hands is not rare,—manifestations that remind one of a slight grade of acromegaly. These acromegaloid changes of the hands, feet, and sometimes of the face, are directly attributable to the oversecretion of the anterior lobe of the pituitary body.

In the usual cases of acromegaly in women, we often find amenorrhea and sterility. As far as present reports go, pregnancy is not disturbed and runs to a successful termination in women suffering with acromegaly.

Whether the posterior lobe adds any additional secretion during labor to stimulate uterine contractions is not known; but we are all aware of the potency of the extract of the posterior lobe of the pituitary gland upon uterine contractions when administered to a pregnant woman.

The glycosuria of pregnancy is also due to a stimulating effect of pregnancy on the pituitary gland. Some direct experimental evidence for this assumption can be found in the work of Diton, who has shown that injections of ovarian extract stimulate the secretion of pituitrin. J. H. Burn found that pituitrin, though it did not in itself cause hyperglycemia, was, nevertheless, able to inhibit the fall of blood sugar which would otherwise have followed the injection of insulin. I think, therefore, the statement is justified that the glycosuria of pregnancy is due to the stimulating effect of the pregnancy on the pituitary gland which then directly inhibits the internal secretion of the pancreas. It may well be that in its inception this process is physiologic, diverting the stream of sugar from storage in the maternal tissues to the use of the fetus.

#### THE ADRENAL GLANDS

Experimental evidence fully sustains the view that the mother's autoprotective resources are developed coincidently with the growth of the fetus through a corresponding augmentation of the functional activity of the adrenal system. The following observations on the changes of the adrenals during pregnancy are definitely established: (1) The cortex of the adrenal undergoes hypertrophy during pregnancy, especially in the zona fasciculata and the zona reticularis. (2) There is an appearance of vacuoles in the cells of the zona reticularis and a marked pigmentary accumulation which must be looked upon as a sign of increased secretory activity. (3) During pregnancy the



cholesterin content is increased in the cortex of the adrenal gland. The lipoidemia, i.e., the increase of fat in the blood seen in normal pregnancy is largely the result of the increased cholesterin formation in the cortex of the suprarenal gland.

Pollak could demonstrate during pregnancy a heightened glycosurie action of adrenalin. This tendency of pregnant women to alimentary glycosuria and alimentary ketonuria is well known. Many authors cite those disturbances as stigmata of a disturbance of liver function, as a result of degenerative changes. But Wilhelm Faltz says that it is rather incredible that a normal physiologic process, such as pregnancy is, should regularly lead to such severe disturbances of the liver, and he would, therefore, regard the glycosuria as an increased irritability of the liver cells rather than as a degenerative process.

The occurrence of pigmentation on the face, around nipples and abdomen during pregnancy is explained in the following manner: the pigment is iron-free and, therefore, is not a derivative from the blood. It is well known that disturbed function of the adrenals will lead to the deposition of pigment. In Basedow's disease, e.g., the production of adrenalin is increased and in Addison's disease it is lessened, and in both of these conditions abnormal pigmentary deposition is frequent. Hence, it is quite possible that the regular occurrence of pigmentation, along the linea alba, navel, perineum, labia majora, areolae of nipples, and in the face (chloasma uterinum) is due to increased action of the adrenals.

The fact is also recognized that there is a distinct increase in growth of hair during pregnancy, due to increased activity of the suprarenal cortex. Halban demonstrated the increased-growth-tendencies of the hair in animal experiments. After shaving the abdomen of pregnant animals the hair grew faster than on the abdomen of nonpregnant animals similarly treated. There are also cases on record of women who, during each period of pregnancy, became excessively hirsute, and following labor there was a gradual loss of hair and a return to normal.

All of these facts support the assertion that there is an increased activity of the adrenals during pregnancy. It is true, that thus far it has been found impossible to demonstrate an increased adrenalin content of the blood during pregnancy. This, however, may perhaps be due to our lack of a finer laboratory technic.

Sajous<sup>12</sup> explains the occurrence of eclamptic seizures on the following basis: "During pregnancy the mother's blood becomes increasingly laden with waste-products, those of the developing fetus being added to her own. To protect the organism her adrenal system and thyroid apparatus become increasingly active, owing to the exciting action of the waste products on these organs. When the adrenal system does not become sufficiently active to enhance adequately the blood's antitoxic properties, the toxic wastes are allowed to accumulate in the blood in sufficient quantities to provoke convulsions. The convulsions are due to irritation by these poisons of the vasomotor and sympathetic centers. All the vessels of the body being violently contracted, a wave of blood is forced into all capillaries, including the cellular elements and neuroglia of the cerebrospinal system. The activity of the cortex being suddenly enhanced, a flood of impulses is transmitted to every portion of the spinal system and the seizure occurs."



## CONCLUSION

This summarizes our present meager knowledge of the relationship between the glands of internal secretion and pregnancy. In conclusion, we wish to say a few words concerning the endocrine therapy of certain disturbances complicating pregnancy.

The pregnant condition brings with it an increase in the metabolic processes of the female organism, resulting in part from the hyperplasia of the thyroid, adrenals, and hypophysis. The increased secretion of these organs brings about an increased irritability or power of response of the sympathetic and parasympathetic systems. Some authors who maintain that the pernicious vomiting of pregnancy is due to this irritation of the sympathetic nervous system, advocate ovarian extract which is supposed to have an inhibitory action on the sympathetic system, and thus produces relief in a certain number of cases. It has also been observed that the blood of eclamptic patients has the power of vasoconstriction, due possibly to an overactivity of the hypophyseo-adrenal system. Also this vasoconstriction can be overcome by the injection of ovarian extract.

The neuropathia gravidarum, a tendency to dropsy, and the dermatoses of pregnancy are also probably expressions of excessive or perverted secretory activity of the endocrine glands.

It stands to reason, therefore, that, if future investigation delineates more clearly and definitely the exact modus operandi of the toxemias in relation to internal secretions, we shall then perhaps be enabled to have a rational system of endocrine therapy for these conditions. But until these means become available, strict adherence to the fundamental methods must be advised; namely, rest, hygiene, elimination, and stimulation.

## REFERENCES

- <sup>1</sup>Lang: *Ztschr. f. Geburtsh. u. Gynäk.*, 1889, xl, 34.
- <sup>2</sup>Comte: *Thèse*, 1898.
- <sup>3</sup>Halban, J.: *Monatschr. f. Geburtsh. u. Gynäk.*, 1900, xii, 498.
- <sup>4</sup>Halban, J.: *Arch. f. Gynäk.*, 1903, lxx, 205.
- <sup>5</sup>Launois and Moulon: *Compt. rend. Soc. de biol.*, 1903, p. 443.
- <sup>6</sup>Frankl: *Arch. f. Gynäk.*, 1903, lxxiii, 438.
- <sup>7</sup>Seitz: *Innere Sekretion und Schwangerschaft*, Leipzig, Barth., 1913.
- <sup>8</sup>Kleinhaus and Schenk: *Ztschr. f. Geburtsh. u. Gynäk.*, lxxvi, 213.
- <sup>9</sup>Barker: *Endocrinology and Metabolism*, New York, 1922, D. Appleton & Co.
- <sup>10</sup>Launois: *Thèse de la faculté des sciences de Paris*, 1904.
- <sup>11</sup>Launois and Moulon: *Ann. de gynéc. et d'obst.*, 1904, i, 2.
- <sup>12</sup>Sajous: *Internal Secretions and Principles of Medicine*, Philadelphia, 1918, F. A. Davis.
- <sup>13</sup>Falta: *Endocrine Diseases*, Philadelphia, 1923, P. Blakiston's Sons & Co.
- <sup>14</sup>Starling and Lane-Clayton: *Proceedings Phys. Soc.*, London, 1905, lxxvii, 41.
- <sup>15</sup>Tandler and Grosz: *Wiener klin. Wehnschr.*, 1907, xx, 1596.
- <sup>16</sup>Reuss: *Wiener klin. Wehnschr.*, 1908, xxi, 1116.
- <sup>17</sup>Cushing: *The Pituitary Body and Its Disorders*, Philadelphia, 1912, J. B. Lippincott Co.
- <sup>18</sup>Hofbauer: *München. med. Wehnschr.*, 1920, lxxvii, 617.
- <sup>19</sup>Tomor: *Arch. für Frauenkunde u. Eugenik*, 1921, vii, 111.
- <sup>20</sup>Stimson: *AM. JOUR. OBST. AND GYNEC.*, 1922, iv, 413.
- <sup>21</sup>Frankl: *AM. JOUR. OBST. AND GYNEC.*, 1923, vi, 399.
- <sup>22</sup>Editorial: *Jour. Am. Med. Assn.*, 1924, lxxxiii, 1433.
- <sup>23</sup>Daly and Strouse: *Jour. Am. Med. Assn.*, 1925, lxxxiv, 1798.
- <sup>24</sup>Allen, Pratt, Doisy: *Jour. Am. Med. Assn.*, 1925, lxxxv, 399.

## Selected Abstracts

### Syphilis

**Browne:** On the Influence of Pregnancy on the Wassermann Reaction and on the Clinical Manifestations of Syphilis. *Journal of Obstetrics and Gynaecology of the British Empire*, 1923, xxx, 519.

The author found no positive evidence that the Wassermann reaction is modified by pregnancy. In no case of a Wassermann-negative mother delivering a macerated fetus was it possible to find spirochetes in the fetus. Unless organisms are demonstrable, no macerated fetus may be considered syphilitic. Certain pathologic changes are characteristic in the tissues of the syphilitic fetus. In the macerated fetus of a Wassermann-negative mother these changes do not come up to the standard relative weight proportions found in spirochete-positive tissues. So-called latent syphilitic women without history of positive Wassermann (habitually delivering at or before term stillborn infants or infants dying in the first few days after birth, in whose tissues spirochetes cannot be found) may represent some as yet obscure blood disease allied to that of general fetal edema. In these cases macerated, spirochete-negative fetuses tend to recur with successive pregnancies. In each case the secondary manifestations of syphilis, enlarged liver, spleen, and placenta may be found, but no spirochetes.

In 48 pregnant women with presumably recent syphilitic infection the Wassermann reaction was positive in 82 per cent. In the four exceptions some treatment had been received or positive evidence of syphilis was lacking. No evidence was obtained, therefore, to show that pregnancy modified the blood reaction. While a history of syphilis was obtainable in 70 per cent of Wassermann-positive primigravidae, it was obtained in only 2 per cent of multiparae. The Wassermann reaction on the blood from the umbilical cord is a reliable means of diagnosing syphilis of the fetus. The reaction is slightly less positive than the mother's blood.

H. W. SHUTTER.

**Bathe:** The Sachs-Georgi Flocculation Reaction in Pregnancy. *Monatsschrift für Geburtshilfe und Gynäkologie*, 1922, lviii, 21.

A study was undertaken to determine whether in a pregnancy, which is associated with changes in function of various organs, a flocculation reaction would be obtained. Sera from 600 women were studied. The patients were divided into three groups depending upon the method of studying the serum. It was found that there was a marked tendency to autoflocculation of the serum. This occurred in from 10.4 to 26.2 per cent of the cases, depending upon the group. The increased incidence of autoflocculation in the sera of pregnant women speaks for an increased nonspecific sensitiveness. Deducting the cases of autoflocculation, it appears that the results of the Sachs-Georgi reaction in pregnant women run parallel to the nonspecificity of the Wassermann reaction. Of greatest importance are the extracts used in the tests. These must be controlled by testing sera other than those from pregnant women. That serum diagnosis of syphilis during pregnancy based upon purchasable or even freshly prepared extracts should be made with great reserve, and without clinical support, is void of meaning.

J. P. GREENHILL.

**Vulovic, Ljubomir:** On the Early Diagnosis of Congenital Syphilis at Birth Through Demonstration of Spirochetes in the Umbilical Cord. *Klinische Wochenschrift*, 1923, ii, 2235.

Histologic study of the umbilical cord in suspected congenital lues was proposed before the discovery of the *Spirocheta pallida*. Bondi held that edematous infiltration of the vessel walls, accompanied with emigration of polymorphonuclear leucocytes was pathognomonic. Mohn later showed that in cords showing such changes, spirochetes could always be demonstrated, especially in the wall of the vein.

Of late, many authors have described luetic ulcers of the navel in the newborn, in which spirochetes can always be demonstrated. This lesion may be the first, or indeed the only sign of syphilis.

The author used the dark-field method in his research, as it is relatively easy, and gives as satisfactory results as the more tedious histologic study. When the cord was ligated, a section 3 to 4 cm. long was cut from the fetal end, and from the end of this section nearest the child a scraping was made (discarding the first material secured), taking care to secure some material from the inner side of the wall of the vein. This was diluted with a drop of physiologic salt solution, mounted under a cover-glass (being careful to avoid air bubbles), and examined at once by the dark-field method. A total of 1,024 cases were studied, and these were divided into six groups. Group I included 703 consecutive, unselected cases, and all gave negative findings. Group II comprised 280 babies, whose mothers gave histories of one or more abortions or premature labors, but not of any other suspicious symptoms. All were negative. Group III consisted of 17 cases, with old treated maternal lues, or latent maternal syphilis with positive Wassermann reactions; also a few cases with apparently nonspecific positive reactions. No spirochetes were found. Group IV was made up of 15 macerated fetuses, but only three of the mothers had positive reactions. No spirochetes were found. Six babies were autopsied, and in none of them were luetic lesions found. Group V comprised 5 cases of mothers infected late in pregnancy, with fresh luetic lesions and the primary lesions still in evidence. The cords were negative. In Group VI there were 7 cases with spirochetes in the cords. Five mothers showed positive Wassermann reactions, one reacted positively once and was negative once, and in one case there was no report; five mothers had no luetic lesions. The diagnosis was confirmed clinically three times, and twice by autopsy. Two of the children were apparently perfectly well up to the time of the report.

The absence of spirochetes in the cords of the macerated fetuses was naturally puzzling. Positive findings in living children are of practical importance; however, the non-development of signs of lues in two of the children in Group VI is not compatible with the diagnosis of congenital lues. Negative findings (careful search being taken for granted) can be considered as eliminating lues. E. L. KING.

**Vignes:** Syphilis During Gestation and Confinement. *Paris médical*, 1924, xiv, 194.

Chancre of the vulva during pregnancy is not only larger, but more prolonged than at other times. Its color is bluish, resembling a pansy, or may be multi-colored. It is not affected by mercury but usually yields to arsenicals. Secondary lesions also have a tendency to hypertrophy, at times forming tumors of considerable size, which often excrete a considerable amount of serous exudate. Livid ulcers occur. Their duration also is prolonged, but usually they yield to salvarsan.

During delivery, syphilitic lesions of the vulvoperineal region render the tissues more friable, causing extensive lacerations. Chancre of the cervix may be discovered during delivery as a cause of dystocia. The cervix may be so firm as to

make delivery impossible. The fetus, already of low vitality, may succumb during a prolonged labor. Even incision of the cervix may render delivery impossible due to induration of the surrounding tissue so that cesarean section with hysterectomy may be necessary, even though there usually is little hope of saving the child.

In a woman recently infected who becomes pregnant, the general course of the disease, as well as of extragenital lesions, is not affected. However, a woman whose general health has been affected by syphilis usually becomes worse when pregnant. Also such symptoms as neuralgia, headaches, etc., are usually augmented. Vignes concedes the claims of Moore that in a woman infected coincident with impregnation, or during pregnancy, the disease may run a very mild course. He agrees with Williams, that a pregnant woman with lues may react more readily to treatment, but feels that these cases are the exceptions rather than the rule.

Vignes has not observed that pregnant women with latent syphilis are more prone to albuminuria or eclampsia, nor has he noticed any difference in the healing of abdominal wounds after cesarean section. He does not believe that puerperal infection is more common in leutic women, whether the disease be active or latent. Hydramnios and premature expulsion of a dead fetus should always suggest syphilis.

Vignes is quite emphatic in stating that the Wassermann reaction made with blood of pregnant women as well as from the cord of newborn infants, is unreliable. Not only may it be positive in the nonsyphilitic, but negative in the syphilitic.

R. E. WOBUS.

**Mönckeberg, C., and Avilés, M.: The Histopathology of Syphilitic Placentas and Its Clinical Importance.** *Gynécologie et Obstétrique*, 1924, ix, 419.

This article is based on a study of 50 syphilitic placentas. In all of the cases the placenta was friable, this being one of the causes of retention, a complication occurring in 50 per cent of these cases. Edema was almost constant, being manifested by an increase in the weight of the placenta. There was a difference in this respect between old and recent cases of syphilis, the weight ratio of the placenta to that of the fetus being almost normal in the first group. Infarcts were found in 16 per cent of the cases on microscopic examination, and the authors noted other microscopic characters as follows: Considerable diminution of blood lakes due to hypertrophy of the villi; irregular hypertrophy of the syncytial layer; proliferation of Langhans' cells; marked endarteritis and endophlebitis (80 per cent of cases), with a thickening of the tunica media and of the adventitia; dilatation and considerable increase in the number of vessels. These alterations of the blood vessels produce a defective irrigation; the cells which line the villi consequently degenerate easily, with the result that fibrin is deposited on them and several villi become glued together by the fibrin.

*Decidua vera.*—The lesions mentioned above are also present in this membrane. They explain its considerable thickening and particular friability. *Chorion.*—The connective tissue was infiltrated by embryonal cells. *Amnion.*—A more or less intense leucocytic infiltration of the connective tissue layer under the endothelium was observed. When this infiltration was not very marked there was an enormous multiplication of the endothelial cells, which assumed the appearance of the syneytium of the villi. *Umbilical cord.*—This was edematous in cases of maceration. An intense process of panarteritis and phlebitis was also much in evidence. In 36 per cent of the cases Wharton's jelly was infiltrated by leucocytes. The disturbances which these lesions cause in the nutrition and hematosis of the fetus are sufficient to account for the death of the embryo, which is so common in syphilis.

In cases of syphilitic abortions the lesions of the villi described above may not be found, or are so attenuated that they do not suffice to explain the death of the fetus; but in such cases there are always intense lesions of syphilitic endometritis in the decidua. When the fetus dies near term the placental lesions are not very grave, but there are always alterations in the vessels of the cord.

Syphilitic hydramnios may be conceived to be produced by several factors; placental lesions, increased tension in the fetal circulation due to enlargement of the fetal liver which compresses the portal vein and ductus venosus, lesions of the vessels of the cord and inflammation of the amniotic serous membrane.

Although the presence of spirochetes in the organs of syphilitic fetuses would lead one to suppose that they are also present in the placenta, they have rarely been found in this organ, owing to technical difficulties and to the fact that phagocytosis is more intense in the placenta than in any other organ. The authors themselves were unable to find spirochetes in any of the placentas which they examined.

FRED L. ADAIR.

**Tvedegaard, G.: Fetal Syphilis.** *Acta Gynecologica Scandinavica*, 1924, ii, Supplement, pp. 1 to 362.

Syphilitic endometritis was found by the author to be very common among women suffering from syphilis. No localizing symptom of this condition could be detected but it occurred with great regularity in patients who gave birth to children with congenital syphilis. The disease manifests itself as an intense and diffuse infiltration of the decidua basalis and parietalis with leucocytes which usually invade the chorion as well as the placenta.

The intensity of the endometritis corresponds to the number of spirochetes in the uterine blood and to the intensity of the disease in the fetus. The author maintains that once the disease has been established in the fetus it remains uninfluenced by treatment of the mother. This is due to the entire or almost entire lack of resistance of the fetal powers against infection. The power of resistance depends on the ability of the organism to produce reactive tissue, as for example wandering cells, granulation tissue or other proliferations. This reactive tissue is not found in young fetuses, hence, these fetuses die early and are stillborn. In the older fetuses there is reactive tissue, hence, these children are born alive. However, since the formation of the reactive tissue in the latter is very weak, these children die soon after birth. Due to the very weak power of resistance, fetuses show an extreme intensity of the disease as compared with their mothers and they show large numbers of, and very virulent, spirochetes.

All the fetuses which are infected early with syphilis die either at birth or shortly afterward because the disease has had a sufficient time before birth for complete development. Fetuses infected later are born alive in the incubation stage and in them the disease is much less serious than in the fetuses infected early in pregnancy. Symptoms, however, appear in the former before the end of the second month.

Pregnant women with syphilis should be treated throughout the entire pregnancy even though no symptoms are present, because women without symptoms infect their children just as often as those with symptoms. The treatment of the mother has no effect on the fetus and maternal antibodies do not pass over into the fetus. The disease in the fetus is acquired from the mother but is otherwise independent of the maternal disease.

J. P. GREENHILL.

**Roberts, C. S. Lane: The Relation of Syphilis to Obstetrics.** *British Medical Journal*, November 24, 1923, p. 971.

The author states that 10 per cent of all marriages involve a syphilitic individual, 75 per cent of all offspring in a syphilitic family are infected with syphilis,

and that 30 per cent of pregnancies in such families end in death of the fetus at or before term. Forty per cent of stillborn premature infants are syphilitic. Twenty-five per cent of all fetal deaths are caused by syphilis. Sixteen per cent of stillbirths are directly due to syphilis. Seventy-eight per cent of syphilitic infants born alive die in the first year, and the remaining 22 per cent die in early childhood.

The more unusual modes of infection may be classified as follows: prenatal infection of mother and child, intranatal infection of the child, postnatal infection of the child.

The author considers the relationship of syphilis to antenatal supervision. He also considers the prognosis as regards modification of the disease and the effect on the fetus. This is considered from the standpoint of the time during pregnancy at which infection took place, and the source of infection, the age of the disease in the transmitter, the parity of the mother, and the treatment used. The author also considers the effect of pregnancy on syphilis in the alteration of the Wassermann reaction and the protection from manifestations of the disease, the disturbance in time relations of the three stages of syphilis, the alteration from a typical response to infection, the production of a symptomatic neurosyphilis.

He also considers the effect of syphilis on pregnancy, the effect of syphilis on labor, the effect of syphilis on the puerperium. The author also considers the antenatal management, considering the difficulties of diagnosis and methods of treatment. He also considers the care of the syphilitic infant.

F. L. ADAIR.

**Klaften and Kalman: Studies on Syphilis and Pregnancy.** *Zeitschrift für Geburtshilfe und Gynäkologie*, 1923, lxxxvi, 123.

From a study of 96 luetic cases occurring in 5,738 births, the authors come to the following conclusions: Obstetrical clinics are given the opportunity to pick up unrecognized cases of latent lues. The Wassermann reaction is a valuable aid in recognizing these cases, and should be performed in every instance.

There does occur nonspecific positive reaction dependent upon pregnancy, yet among 912 carefully studied house cases, complete inhibition occurred in only one case. A swing to a negative reaction during the puerperium occurs not infrequently; in all such cases the Wassermann should be repeated.

Antiluetic therapy for both mother and child should be begun as early as possible.

MARGARET SCHULZE.

**Lévy-Solal: Syphilis of the Ovum and Fetus.** *Paris Médical*, 1923, xiii, 537.

That the ovum may be infected by the spermatozoa is possible, though not definitely proved. That the mother of such an infected fetus may remain free from syphilis, Lévy-Solal believes, is also possible as the mother may acquire an immunity by absorbing toxic products from the ovum. On the other hand, he thinks that most, if not all of these cases, are merely latent cases of maternal lues. That the fetus may be infected by the mother is beyond a doubt, yet the placenta seems a barrier to the passage of the spirochetes as they are not often found in large numbers in the placenta itself. At any rate, the fetus may be permeated with spirochetes and the mother free from active lesions and, while the placenta may be infected, it may on the other hand be entirely free from spirochetes.

Lévy-Solal believes that the virulence of the fetal infection depends somewhat on the time of gestation when infection actually takes place. If the ovum is infected very early, it simply dies and is expelled. The nearer to term the fetus is infected, he thinks, the more immune it has become to syphilis and may therefore be born apparently healthy.



He made a careful examination of a syphilitic fetus and found the most active lesions in the lungs and liver which he describes minutely. He shows that a fetus may present pathologic lesions of such severity as to be incompatible with life, points out on the other hand that these lesions may be so mild that, under treatment, perfect restitution is possible. In addition to the well-known lesions of the placenta, attention is called to the lesions of the membranes and of the cord.

Lévy-Solal finds that the more recent the infection of the parents, the more baneful the effect upon the offspring. Having observed the effect of treatment in connection with Pinard and Tzanck, he agrees with the former that treatment of the parents before conception is the ideal but that much can be accomplished by treating the mother after conception, provided the beginning of treatment is not too long delayed. Arsenical medication proves more beneficial than mercurial and as a rule two or three series of from seven to nine large doses of arsenobenzol are administered.

R. E. WOBUS.

**Nathanson: Syphilis in Relation to Pregnancy.** Surgery, Gynecology and Obstetrics, 1925, xli, 320.

Syphilis was diagnosed in 2.90 per cent of 413 pregnant women, which fairly agrees with the incidence of 3 to 4 per cent reported by other investigators. The performance of routine Wassermann test in pregnancy constitutes a most valuable diagnostic procedure. Colles' law has neither been conclusively proved nor disproved. The finding of a positive Wassermann in the mother during pregnancy does not necessarily mean that the child will develop syphilis. Routine microscopic study of the placenta for evidences of Fraenkel's disease affords more conclusive evidence as to the presence or absence of syphilis than does serologic investigation. Syphilis is not an important factor in the production of abortions in the first trimester of pregnancy, and it has little influence on the incidence of miscarriages during the second trimester but it is the commonest single cause of premature births and stillbirths in the last trimester. If a diagnosis of maternal syphilis is made, the patient should be intensively treated along appropriate lines irrespective of the duration of pregnancy. Every infant showing signs of congenital lues should receive antiluetic treatment, and should be kept under surveillance for a long period of time. Extreme caution should be exercised in choosing a wet-nurse for an apparently nonsyphilitic infant, and similarly no syphilitic child should be nursed by a nonsyphilitic woman. The author closes his paper with the plea that all departments of medicine should cooperate in an effort to combat the incidence of syphilis in pregnancy with its resultant economic burden upon the state, and its great waste of human life.

WM. C. HENSKE.

**Fischl: Profeta's Immunity.** Monatschrift für Kinderheilkunde, 1923, xxv, 110.

It is now quite generally accepted that the seeming "immunity" of the mothers of hereditary syphilitic children (Colles' law) in reality depends not on immunity but on the presence of a latent syphilis in the mother. It might be inferred that Profeta's law ("a nonsyphilitic child born of syphilitic parents is immune") could be similarly explained. A review of numerous studies reveals a wide divergence of opinion on the subject and this is the reason for the present contribution. Thirty-three mothers with frank syphilitic symptoms, and nursing their children at the breast, were observed for periods ranging from one and one-half to fourteen months. The Wassermann reaction in the mothers was positive in nine cases, negative in six, and "variable" (at times positive and at others, negative) in sixteen. In the children, the Wassermann was constantly negative in twenty-five cases, and variable in eight. The reaction was repeated in mothers and children, up to ten or twelve times. Fifteen of the women had never been treated and the rest in-

sufficiently. The children looked healthy and appeared to thrive, and it would seem that immunization had occurred, probably through the breast milk. In one case, a syphilis-like rash appeared for one day only, and the Wassermann was positive on this day, but negative before and after—possibly this was an abortive syphilis.

T. C. HEMPELMANN.

**Thompson, Warren: Syphilitic Backache.** American Journal of the Medical Sciences, 1922, clxiv, 1.

The author cites two cases in which the diagnosis was certain and benefit from specific treatment evident. He states that syphilis of the spinal column while rare is no doubt frequently overlooked and should be thought of in the etiology of backache when no other cause can be discovered. The lesion is usually in the cervical or lumbar regions. The clinical picture is indefinite, although backache worse at night gives a clue. The pathology is the same as in bone syphilis elsewhere in the body. Antispecific treatment is curative.

WM. KERWIN.

**Portis, Bernard: Syphilis of the Uterus and Adnexa.** Surgery, Gynecology and Obstetrics, 1923, xxxvii, 37.

After calling attention to the infrequency with which any syphilitic lesions of the female generative tract are observed and the lack of uniformity of the histologic descriptions in the literature, this author reports specific changes in the cervix, body of the uterus and ovary of a patient upon whom a panhysterectomy was done. The diagnosis was corroborated in each site by the demonstration of treponema stained by the Levaditi method. The author states that this was the first conclusive diagnostic proof of syphilis in a series of 1366 uteri subjected to pathologic study.

Because the arteritis and sclerosis were less well marked than the lymphatic invasion, and because the secondary eruption appeared after operation, the opinion is expressed that the invasion in this instance was recent and ascending by way of the lymph channels from a chancre on the cervix. Specific processes of a more chronic nature and the changes following repeated involution can less readily be differentiated.

CREADICK.

## Books Received

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**THERAPY OF PUERPERAL FEVER.** By Dr. Robert Koehler, Vienna. American edition prepared by Dr. Hugo Ehrenfest, St. Louis. With 27 illustrations. St. Louis, The C. V. Mosby Company, 1925.

**DISEASES OF CHILDREN.** By the late Sir James Frederic Goodhart. Twelfth edition, by George Frederic Still, professor of diseases of children, King's College, London, etc. With 68 illustrations. Philadelphia, Lea & Febiger, 1926.

**ANNUAL REPORT OF THE SURGEON GENERAL OF THE PUBLIC HEALTH SERVICE OF THE UNITED STATES.** For the fiscal year 1925. Washington, Government Printing Press, 1925.

**SUITES DE COUCHES NORMALES ET PATHOLOGIQUES.** Par E. A. Rene de Cotret, accoucheur en chef de la Maternité, etc. Montreal, La Cie d'Imprimerie Godin, Montreal. 1919.

**L'OBSTETRIQUE DES GARDS-MALADES.** Par E. A. Rene de Cotret, professeur de clinique obstétricale à la faculté de médecine, etc. Montreal. 1925.

**PYGMALION, or the Doctor of the Future.** By R. M. Wilson, M.B., Ch.B., New York, E. P. Dutton & Company. 1925.

**RATIONAL GLAND THERAPY FOR WOMEN,** particularly in relation to menstruation. By I. Wanless Dickson. London, H. K. Lewis & Co. 1926.

**OPERATIVE SURGERY.** By J. Shelton Horsley, M.D. Attending surgeon St. Elizabeth Hospital, Richmond, Va. With 666 original illustrations. Second edition. St. Louis, The C. V. Mosby, 1924.

**OPERATIVE CYSTOSCOPY.** By E. Canny Ryall, F.R.C.S. Senior surgeon to ALL Saints' Hospital for Genito-Urinary Diseases, London. With 115 plates containing 670 original illustrations of which 528 are colored. St. Louis, The C. V. Mosby Company, 1925.

**TUMORS OF THE COLON AND RECTUM.** Their pathology, diagnosis and treatment. By Jerome M. Lynch, surgical director, St. Bartholomew's Hospital, N. Y. and Joseph Felsen, attending pathologist, St. Bartholomew's Hospital. Paul Hoeber, Inc., New York, 1925.

**MODERN VIEWS ON THE TOXEMIAS OF PREGNANCY.** By O. L. V. de Wesselow, chemical pathologist, St. Thomas' Hospital and J. M. Wyatt, obstetric physician in charge of out-patients, St. Thomas's Hospital, London. Paul B. Hoeber, Inc., New York, 1925.

BIOLOGIE UND PATHOLOGIE DES WEIBES. Herausgegeben von Professor Josef Halban, Wien, und Professor Ludwig Seitz, Frankfurt a.M. Lieferungen 18, 19 und 20. Urban & Schwarzenberg, Berlin. 1925.

GEBURTSHIFLICHES BREVIER fuer Aerzte und Studierende. Von Dr. Franz Eberhart in Baden-Baden. Urban & Schwarzenberg, Berlin, 1925.

BIRTH CONTROL. Facts and Responsibilities. By Adolph Meyer, M.D. The Johns Hopkins Hospital. The Williams & Wilkins Co., Baltimore, 1925.

AN INTRODUCTION TO SEXUAL PHYSIOLOGY, for biological, medical and agricultural students. By F. H. A. Marshall, F.R.S. Longmans, Green & Co., New York, 1925.